REVIEW OF THE CATCH SIZING AND AGING OF KING (Scomberomorus cavalla) FROM U.S. GULF OF MEXICO AND SOUTH ATLANTIC FISHERIES

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SUMMARY

Catch data from commercial and recreational fisheries for king mackerel are sized by sex to generate catch-at-size (CAS) tables. Then the CAS data are converted into catch-at-age (CAA) tables also by sex and combined sexes; these constitute the main input for stock assessment protocols. Aging of the CAS are done by using age-length-keys (ALK) when available, or by a stochastic-aging method using current age-size relationships by sex. A review of the size-samples, aged-fish samples for ALK, sex-ratios, and the protocols applied is presented.

Introduction

King mackerel commercial and recreational fisheries in the US extend from the Northeast states of New York and Virginia to Texas. Presently, this fishery is managed under the Coastal Migratory Pelagic Resources Fishery Management Plan implemented in February 1983. The FMP recognized two different stocks for the purpose of fishery management: the Atlantic migratory stock extending from New England to the South Florida east coast, and the Gulf of Mexico migratory stock extending from the Florida West coast to the Texas border with Mexico. The FMP also recognized the seasonal mix of these stocks on the East coast of Florida. At present, for management and assessment purposes, there is a mobile boundary between Atlantic and Gulf stocks; in the winter (November 1st to March 31st), the boundary is defined as a line due east from the Volusia/Flagler County coastal border. While in the summer (April 1st to October 31st), the boundary is defined as a line due west from the Monroe/Collier County coastal border (Fig 1).

Commercial and Recreational Landings Data

Catch data from commercial fisheries have been collected by NMFS and individual state programs and were extracted from the SEFSC Accumulated Landings System (ALS) and General Canvass files or provided by the NMFS Northeast Regional Office. Recreational catch was estimated by the Marine Recreational Fishery Statistics Survey (MRFSS), NMFS Headboat Survey, and the Texas Parks and Wildlife Coastal Creel Survey. Table 1 and Figure 2 show the catch for king mackerel Atlantic and Gulf stocks (data for 2001-02 are partial; "year" is the calendar year).

Commercial catch inputs are in weight units (lbs), by month, state, county (FL only) and gear. Tables 2-3 and Figure 3 show the distribution of catch by gear for the commercial sector. Gear was not available from the ALS for Florida monthly landings before 1997. For 1984-96, gear for Florida landings

was estimated for the mackerel assessments by the SEFSC Statistics Division using information from Fishery Reporting Specialists about individual landings, knowledge of general trends in gear use and regulations concerning gears in certain areas, and amount of catch. Generally, the only gears assigned were hook and line or gillnet (with all types of gillnets and other net gears assigned to gillnet), but the Data Review Panel in 1989 felt that it was important to distinguish between drift gillnets and non-drift gillnets in East Florida during the summer months in 1985-89, when they most likely were operating simultaneously. For 1981-83, gears were assigned using Florida General Canvas gear information (annual data) and the general rule that Martin, St. Lucie and Monroe Counties had gillnet catches during January-March. It was assumed that with the start of the Florida Trip Ticket system in 1986; all landings were recorded in the data files as whole weight. For 1985 and earlier, it was assumed that weights for Florida landings were "aslanded" in the data files. The Statistics Division estimated that 100% of the net catches and 90% of the hook and line catches were landed gutted (some charterboat catch was sold as whole). Gutted weight for those years was converted to whole weight using a factor of 1.04.

Recreational catch inputs were the numbers of fish by state (ie. Florida East and West as separate states), mode (ie. private, shore, charterboat, headboat, or charterboat and headboat combined), month or groups of months. The MRFSS estimates of catch released alive were not used. Tables 4-5 and Figure 4 show the distribution of recreational catch by mode. The MRFSS estimate for Florida East (FL-East) included Nassau through Dade Counties, and Florida West (FL-West) included Monroe through Escambia Counties. In January-March and November-December, when the Volusia-Dade counties were part of the Gulf migratory group, the entire MRFSS estimate for FL-East was assigned to the Gulf group. Thus, Nassau-Flagler counties from the Atlantic group were included in the Gulf group. In April-October, Monroe county was part of the Atlantic group, but was included (with the FL-West MRFSS estimate) in the Gulf group. The estimates of catch from MRFSS were for bimonthly periods, but March-April was subdivided equally for the FL-East estimate when this area shifted from the Atlantic to the Gulf stock. These assignments most likely did not have much impact on the assessments, since little recreational catch was taken in those areas and months which were mis-assigned.

The distribution of commercial catch by region is presented in Tables 6-7 and Figure 5. The recreational catch by region in Tables 8-9 and Figure 6 shows similar distributions. For the recreational sector, the values presented were the estimated catch in weight, after sizing the catch in numbers. Since the implementation of the FMP, allowable king mackerel catch was partitioned among sectors and regions based on historic unregulated catches, thus the distributions by regions presented in Figures 5 and 6 may reflect these restrictions. At present, for the Gulf migratory group, the total allowable catch (TAC) is allocated with 68% for the recreational fishermen and 32% for commercial sector. The commercial sector was further subdivided as 69% for the eastern zone (Florida west and east coast) and 31% for the western zone (Alabama, Mississippi, Louisiana and Texas). For the TAC of the king Atlantic migratory group, 62.9% was allocated to the recreational fisherman and 37.1% to the commercial sector (GMFMC and SAFMC 1998). To further review the distribution of catch by gear and smaller areas, Table 10 presents the percent distribution of commercial catch by gear and sub-areas for the last 8 years of king mackerel, and Table 11 presents the percent distribution of the recreational catch.

King mackerel is considered a migratory coastal species, with preference for waters with temperatures above 20° C. In the Gulf of Mexico, kings are more abundant in the northeastern Gulf from the Panhandle area to Alabama and Mississippi during the summer months. In the western Gulf, off Texas, they are available in spring and summer months. In the winter months, they tend to concentrate in the Florida Keys and in the south western Gulf region (Trent et al. 1983). For the Atlantic kings, during the summer months, they tend to move northwards following the 20° C isocline, which may bring them off the New England coast in certain years; however they are commonly present off New Jersey and south. During the winter months, the Atlantic stock also congregates in the south, off the Florida east coast primarily. Commercial and recreational fisheries follow the migratory movements of the stocks.

The catch distribution for the commercial sector of the king Gulf stock by month and subarea is shown in Table 12. This table shows the percentage catch by month for each subarea, the total catch in weight (lbs) for each subarea and their respective percentage of the total commercial catch by year. The

major subareas are the FL-Keys Monroe county (31.5%), the Florida South East (FL-SE) Volusia-Dade (27,4%), and Louisiana (23.9%), respectively for the period 1995-2002. Figure 7 shows the percent distributions by month. For the commercial sector the main peaks were in the winter (December-March) corresponding to the South Florida catches and in the summer (July-August) off Louisiana. Table 13 shows the catch distribution by month and subarea for the commercial king Atlantic stock. The main subareas were the North Carolina (46.1%) and the FL-SE Volusia-Dade (45.4%) for the 1995-2002 period. Figure 8 shows the monthly percent distributions with peaks in April-May mostly from the Florida catch, and October-December from the North Carolina commercial catch.

The percent catch distribution of king mackerel for the recreational sector for 1995-2002 by month group and subarea is shown in Tables 14 and 15. The estimates of catch from MRFSS and TPWD are for bimonthly periods (except March-April for the FL-East estimate which has been split into months), and Headboat Survey estimates are generally by month. In the tables, Headboat catches have been summed into the same bimonthly periods to match the MRFSS and TPWD estimates. For the Gulf stock, Table 14 shows the Florida west coast Monroe-Escambia as the main component (62%), followed by the Florida east Nassau-Dade (16%) and the Alabama-Mississippi (11.2%). Figure 7 (right panel) shows the average distribution bimonthly with an average trend plotted. The South Florida catches were mainly in the winter months (November-March), while in the North Gulf recreational catches were mainly in May-September. For the Atlantic stock, Table 15 shows Florida east Nassau-Dade (46.8%), North Carolina (33.1%) and South Carolina-Georgia (15.1%) as main components. Figure 8 (right panel) shows bimonthly percent distribution, with main peaks in May-October.

Once commercial catch (in weight) and recreational catch (in numbers of fish) were compiled, they were summed over some strata. For the commercial sector, Florida catches were summed within month, county group, and gear group, while non-Florida catches were summed within month, state and gear group. For the recreational sector, modes were grouped into non-headboat modes combined or headboat. MRFSS and Texas PWD estimates were summed within wave (bimonthly period) and state (with FL-east and FL-west separated). Headboat Survey estimates were summed within month and county group for Florida and within month and state for other states. The county groups used in Florida for both commercial and recreational catches were defined to maintain the separation of the two stocks and the mixing zone, and to allow for possible differences in factors pertinent to the assessment along the long coastlines of Florida (e.g. catch levels). Catches were combined over states within regions of low catch: AL-MS, SC-GA, and states north of NC. The MRFSS estimate from the FL east coast for wave 2 (Mar-Apr) was evenly split into single months.

Catch was then sized using size frequencies samples for each year, stock, sector, area and month where available. But before discussing the actual process itself, first the size-frequency samples collected for king mackerel since 1981 are reviewed below.

In additional notes related to catch and landing estimates for mackerels, recreational catch estimates included tournament fishing, but tournament and non-tournament fishing could not be separated. The MRFSS and Texas PWD surveys did not visit tournament sites, but they did not exclude tournament fishers encountered in any part of the survey. Thus, tournament fishing was generally included in the MRFSS or TPWD private boat mode, but almost no samples of fish were taken. Texas PWD and MRFSS both surveyed Texas in 1981-1985, but neither covered all modes. The estimates used in the assessment were a combination of the two surveys and substitutes generated for missing estimates. Since 1986, Texas PWD surveyed Texas while MRFSS covered all other states. Beginning in 1986, the Headboat Survey began to provide the estimates for southeast headboats (TX-NC); the MRFSS eliminated coverage of headboats in the southeast, only including charterboats in the for-hire mode.

Beginning in 2000, the MRFSS began using a new method to estimate charterboat estimates in the Gulf of Mexico. However, because these estimates were not comparable with those from the method used previously, the "old method" has still been used in the assessments (until enough years are available to adjust the earlier years to be compatible with the "new method").

Size Frequency Sample Data

Size frequency sample data for commercial fisheries in the southeast states have been provided since 1983 by the SEFSC Trip Interview Program (TIP). This cooperative program receives data from state sampling programs as well as NMFS samplers in some states. Before 1991, some samples of commercial landings collected under the direction of the NMFS Panama City Laboratory which were not submitted to TIP were also available. (The Panama City Lab samples also included some from recreational catch and from research fishing trips which were similar to commercial or recreational fishing.) There were also small numbers of king mackerel samples from the State of North Carolina not provided through TIP because they appeared in the non-reef fish fishery sector, the only samples from NC submitted to TIP. Samples of commercial landings for states north of NC have not been available.

Size frequency sample data for recreational fisheries were collected by the MRFSS (southeast and northeast states), NMFS Headboat Survey (southeast states) and Texas Parks and Wildlife coastal creel survey, which also provided the recreational catch estimates. As noted earlier, these surveys did not sample at tournament sites, but some tournament sampling was provided by TIP and NC. Occasional samples in TIP were from other recreational catch, or from charterboats which were selling some catch. Some recreational samples through 1990 were from the Panama City Lab's program (see above). The Alabama Charterboat Survey collected samples during 1991-1995. Although some gears other than hook and line were used in recreational fishing and were coded in the MRFSS samples, these were infrequent and the information was not useful because the recreational estimates were for gears combined.

Tournament samples from TIP or NC size-frequency data files were included in the assessment files, but generally were not used in the sizing of the catches. The size-samples from North Carolina tournaments coded as "sector=47" represented measures taken by tournament fisherman who were given measuring boars and were instructed to measure <u>all</u> the fish caught. These can potentially be used in sizing general recreational landings, and were referred to as "unbiased" tournament samples. Size samples from tournaments in other states (as well those from North Carolina coded as sector=81) were considered "biased" in relation to the general recreational catch, as they were sampling fish that entered in the tournament, usually only the larger individuals. Otherwise, tournament samples from all states (except the NC board samples) were considered biased in relation to the general recreational catch even if they were submitted as unbiased samples. Very occasionally, these non-board tournament samples have been used for sizing catches, only if there were very few non-tournament samples and if they appeared similar in mean size and range to those non-tournament samples that were available.

Table 16 and Figure 9 show the total number of king mackerel size sampled by migratory group and sector from 1981 to 2002 (2002 is incomplete). Commercial size samples were predominant in a ratio 3 to 1 compared to recreational size samples. Table 17 shows the distribution of annual samples (number of fish size-sampled) from recreational fisheries for both the Atlantic and the Gulf migratory groups. On average, for the last 10 years 1,800 and 3,500 fish were measured annually from recreational fisheries for the Atlantic and the Gulf stocks, respectively. Figure 10 shows this distribution by mode (Headboat or other modes combined). Table 18 presents the number of fish samples by year and gear from the Atlantic stock commercial fisheries. The total numbers were roughly twice the recreational samples, with an annual average of 5,500 samples in the last 10 years. The largest percent of size samples came from hook and line gear commercial fisheries (Fig 11 left panel). Table 19 presents the size sample distribution of commercial fisheries from the Gulf stock. The average was approximately 5,500 samples per year in the last 10 years (Fig 11 right panel).

Tables 20 and 21 show the percent distribution of size samples by year, month and mode (headboat and other modes combined) from recreational fisheries for the Atlantic and Gulf stocks, respectively. Figures 12 and 13 present the monthly average (as a percent of the annual sample \pm one

standard deviation) trends over the 1981-2002 period, for the Atlantic and Gulf stocks, respectively. For Atlantic king, most recreational size samples were collected from April through October, with no major differences between headboat or other recreational modes. For Gulf king, headboat samples were mainly collected in the summer (Jul-Aug) and winter (Nov-Dec), non-headboat samples were also primarily collected in the summer (Jul-Aug) months. Tables 22 and 23 present the percent distribution of size samples by month from the commercial fisheries for the Atlantic and Gulf stocks, respectively. In the case of commercial fisheries, only the hook & line gear was reviewed, as it accounted for 93% in the Atlantic, and 80% in the Gulf of the commercial size samples. For the Atlantic stock, most commercial samples were collected from April through August, while for the Gulf stock most samples were from December through March (Fig 14).

Looking in the distribution of size samples in the most recent years, Table 24 and Figures 15 and 16 present the number of king mackerel size sample from 1994 through 2002 by stock, sector and subareas. For Atlantic king commercial sector most size samples came from Florida east Nassau-Dade area, while recreational samples came from North Carolina and Florida east Nassau-Dade areas. For Gulf king commercial sector most size samples came also from Florida east Nassau-Dade and Florida Keys Monroe subareas. Instead Gulf recreational size samples were more evenly distributed between Texas, Florida west Citrus-Escambia, and Florida Key Monroe subareas. Table 25 presents the percent size sample distributions by sector, gear and subarea.

Figures 17 through 20 present density size-frequency sample distributions for each migratory group, subdivided by sector and major gear (commercial) or mode (recreational). The data on these plots were restricted to size samples that have more than 100 fish samples, and have corresponding direct match with catch records. Each line in these graphs represents an annual density size distribution. King sample sizes were grouped in 10 cm intervals starting from 20 to 30 up to 140+ cm. Also in these graphs, the left panels are the density size distribution [*y*-axis 0 to 1], while the right panel shows the deviation for each year distribution to the overall average [e.g. in the graph average of all years is represented by the horizontal zero line]. The deviation plots might help to identify particular years where size density diverge significantly from prior or overall average, as in the case for example of strong cohort passing through the fishery. Positive deviations would indicate a larger than normal frequency of particular size class, correspondingly negative deviations would indicate a lower than normal frequency of particular size class.

Figure 17 shows the density size distributions of Atlantic king for commercial (hook & line gear) sector. The commercial size frequency was rather constant for 1981-2002, the most common size(s) of king was 70-80 cm and 80-90 cm. The deviation plot indicates that for 2002, 1983 and 1995, the commercial fishery caught larger size fish. For the recreational sector, size distributions were broader and variable by year, with main size varying from 50-60 in 1985, 60-70 in 1991, to 90-100 cm in 1982 (Fig 18). In recent years, main size recreational catch has been about 70-80 cm, for Atlantic king. Headboat recreational fisheries started size sampling in 1986 for Atlantic king, from 1986-89 the mean size catch was above average, 1990 to 1994 the mean size catch was below average, and in the latest years, the mean size of catch appeared to increase again (Fig 18).

For the Gulf king size frequency density, the commercial samples were divided for hook & line and gillnet gears, although there were only size-samples from 1981 to 1990 for gillnets (Fig 19). As with the commercial fishery of the Atlantic, the commercial hook & line Gulf catch was mainly compose of fish between 70-90 cm. However, larger size fish (80-100 cm) were predominant in early years 1983/84/87, while in 1996/97/99 and 2000 smaller size fish (60-70 cm) were more common. For the gillnet size frequency, most common size varied from 60 to 90 cm. Figure 20 shows the density size frequency distributions for the recreational Gulf king fishery, all sectors (top) and headboat (bottom). The headboat fishery caught smaller size kings (50-70 cm) in 1997 and 1998.

Catch sizing

Catch records were matched to size frequency samples by:

- 1. Year: 1981 to 2002
- 2. Migratory group: Atlantic, Gulf
- 3. Sector: commercial, recreational
- 4. Mode: (only recreational) Headboat, non-headboat
- 5. Subarea: For commercial and recreational headboat -North of NC, North Carolina, South Carolina-Georgia combined, FL NE (Nassau-Flagler), FL SE (Volusia-Dade), Florida Keys (Monroe), FL SW (Collier-Hernando), FL NW (Citrus-Escambia), Alabama-Mississippi combined, Louisiana, Texas. For non-headboat recreational, Florida catches were FL east (Nassau-Dade) and FL west (Monroe-Escambia).
- 6. Gear: hook & line, gillnet(s), trawl, haul seine, purse seine, drift gillnet, trammel net, beach seine, traps & other.
- Month: individual months for commercial and recreational headboat, bimonthly periods for non-headboat recreational.

A minimum of 100 fish per catch was required to "size" a catch, except if the catch was very small (e.g. most headboat or trawl catches), or if not enough samples were available to meet this restriction. For 1981-1983 commercial catches of Atlantic king, the minimum sample size was reduced to 50 fish per catch due to low numbers.

In 1989 the Mackerel Stock Assessment Panel (MSAP) established the following general rules for matching size samples to catch:

- Commercial samples from north-east Florida should not be used as substitutes for sizing SC-GA recreational catches;
- Catches should be sized with samples from the same migratory group only;
- Florida commercial samples should not be used as substitutes for sizing Florida recreational catches;
- And, recreational headboat should be separated from private and charter in the catches and matching of catch and size samples.

If there was not a direct match size sample for a given catch record, an algorithm designated 'alternative' size samples according to the following criteria under the restrictions established by the 1989 MSAP:

- Size samples for the same year, migratory group, sector, mode, subarea, and gear but for months next or prior to the month of the catch record (as long as the month did not violate the definition of migratory stock, within samples from the mixing area);
- Size samples for the same year, migratory group, sector, mode, and gear but for adjacent subareas to the area of the catch record;
- Size samples for other gears/modes/sector with similar size distributions;
- The search for alternative size samples also took into account the minimum size sample of 100 fish, and if necessary, it added one or more size samples until this requirement was completed;
- If the algorithms did not provide alternative size samples, the user assigned manually a size sample for the sizing procedure.

In the following analyses, the designation of a "direct match" for a size sample with reference to a given catch corresponded to size samples that have the same migratory group, year, sector, mode (only apply to recreational; headboat and non-headboat), area, gear and bymonth. Also, the match of size samples to a catch ignored whether the size samples came from a single sampling occurrence (e.g. only one boat sampled) for from more than one sampling case. Thus, samples may be highly clustered. There were many other issues in the commercial samples (from the TIP) that are being studied presently by a separate

group (The TIP Working Group). Therefore, the fact that a given catch had a direct match size samples did not necessarily imply a complete random size sample, particularly if there was only one sample per catch.

Tables 26 and 27 show the percent of the total catch by sector (commercial, recreational) that have direct match size-samples and catch without direct match size samples, for the Atlantic and Gulf migratory groups respectively. Further, the catch with direct match was split between size samples with 100 or more fish and samples with less than 100 fish measured. The same information is presented in Figures 21 and 22. In the case of Atlantic king, for the commercial sector on average 90% of the catch had direct match size samples in the last 11 years (1991-2001), a higher percentage compared to early years when about 70% of the catch had direct match size samples (1981-2000). However, about only 63% of the commercial catch had direct match samples with 100 or more fish per sample. In the case of recreational fisheries, about 98% of the catch has size samples, albeit about 38% had size samples with 100 or more fish, in the 1991-2000 period.

For the Gulf king, the commercial fisheries had on average 80% direct match size samples from 1992 to 2002. This percentage was lower compared with early years (87%, 1981-1991). Also, for the most recent period, the size samples with less than 100 fish increased up to 45% (1995-2002). For the recreational Gulf king fisheries, the size samples covered about 98% of the catch by direct matching since 1991. However, about 40% of the catch had size samples with 100 or less fish per sample, in the same years. Again these catch percentages reflect direct size sample matching, only, overall most of the sizing of the catch for both migratory groups was done with direct size frequency samples for each fishery, gear, area and by month.

Another important component of the sizing of the catch procedure was the classification of catch by sex. King mackerel shows dimorphic growth patterns, with females attaining larger size compared to same age males, for both the Atlantic and Gulf migratory groups (Manooch et al. 1987). The proportion of males at size in the catches of king mackerel showed a decreasing trend with size, most likely due to the sexually-dimorphic growth, catch sizing and catch aging procedures (having taken into account sex ratios to avoid biases in age-structure models). However, as sex identification was not available in all size samples, in 1996 the MSAP adopted a method to estimate sex-ratio-at-length for king and Spanish mackerels (Restrepo 1996). The sex-ratios were estimated using fishery independent sex at length data from commercial and recreational catches from different areas and seasons. The sex ratios were estimated using Generalized Additive models (GAMs) were the proportion of males was modeled as a logit function of the factors year, season, migratory group and a four-degree polynomial of the size (Restrepo 1996). Estimates of sex-ratio [proportion of males] in 1 cm intervals were then provided for the years 1984 through 1994, and for the seasons: summer [April – October] and winter [November – March] for each stock.

In the case of king mackerel, both Atlantic and Gulf stocks, the estimated sex ratios were applied for fish within the size of 50 and 130 cm. For fish less than 50 cm, it was assumed a 50% sex ratio (MSAP 1996).

For years prior to 1984, the MSAP decided to use the 1984 sex-ratio values, and for years 1995+ on, the sizing protocols used the 1994 sex-ratios-at-length. Figure 23 and 24 show the estimates of sex-ratio-at-size by season for Atlantic and king mackerel, respectively. Particularly for Gulf king, the sex-ratios-at-length varied among years, for smaller size fish (50-80 cm). Figure 25 presents the average of all years (1984-1996) for each stock, with Atlantic king having higher proportions of males for the small size classes (50-90 cm) compared to Gulf kings.

In the sizing protocol, if the size-samples had sex information that information was retained and the sex-ratio-at-length was only applied for non-sexed fish. Thus, once the catch and size frequency samples were matched, the output of the sizing protocol provided Catch-at-Size (CAS) by sex for king mackerel.

Catch Aging

Aging protocols for king mackerel have been previously described by Cummings and Turner (2003, Ref), and Cummings (1989). In addition, reports regarding the aging methods, number and source of otolith samples, etc. have been provided in prior assessments to the MSAP (Cummings and DeVries 2003).

Briefly, king mackerel otoliths were collected from commercial, recreational fisheries and research projects. Otolith treatment and reading followed standardized methods and they were all read at the NMFS SEFSC Panama city Laboratory. Age-length keys (ALK) were then generated for each year, quarter and migratory group. The aging of CAS by sex was then performed using preferentially ALKs, whenever possible, and then by a stochastic method, using sex-specific growth functions (Cumming and Turner 2003). The current protocols for estimating age composition of king mackerel were adopted by the MASP in 1989.

Review of the available fish-aged samples, from king mackerel otoliths is summarized in Table 28. Over 31,000 otoliths have been aged from 1986 to 2002*. Table 29 shows the breakdown of otolith samples by sex and migratory group, the Gulf king is further split into the eastern and western regions, in the ALK no samples from Mexico were included. For the Western Gulf (Louisiana - Texas) aging samples were only available until 1994 (Fig 26). For both Atlantic and Gulf stocks, there was a higher proportion of female-aged fish. Fewer fish were not sexed; those samples were also excluded from the ALK (Figs 26 and 27). Figure 20 and Table 30 present the number of otolith samples for Atlantic king (sexed fish) by month and year. Most of the samples were collected between May and October. Instead, for Gulf king most otolith samples were collected in the month of July from 1987 to 1995. Thereafter, most of the samples were collected in the winter months, January and February. The distribution of otolith samples by main areas is shown in Table 32 and 33 for Gulf and Atlantic king, respectively (Fig 31). In general, most samples come from the Florida coast; samples from Louisiana, Texas and Alabama stopped in 1994/95. For Atlantic king, North Carolina provided most of the otolith samples, followed by Florida, and in smaller proportions, South Carolina and Georgia.

Descriptions and evaluation of the aging process, otolith preparation, reading, and validation were provided by DeVries et al (1988). Input files for the ALK consisted of single fish records with size, sex, date, geographic area, and source. The age length keys were then constructed by grouping aged fish into 5 cm. intervals, starting in 30 to 200 cm for king mackerel. The rule guide was to have at least 10 fish or more per size interval. However, due to the low number of samples within bin sizes, normally the bins of the smallest and largest size fish were merged. For example, Table 34 shows the number of aged-fish per 5 cm size interval by age and year, for the eastern Gulf mackerel female group. For this group 10,535 fish were aged, grouping into 5 cm intervals by age and year, generated 1,518 cells, of which only 296 (19%, darker shade in table) have 10 or more fish per cell and 531 (35%, lighter shade in table) have 5 or more fish per cell. Thus, several of the bins were merged into larger size bins. The Table 34 also shows that most of the ALK fish are from ages 1 to 6, although the oldest fish recorded was age 26.

ALK were created for each migratory group Atlantic or Gulf, year, and sex. For the Gulf king ALK were further disaggregated for Eastern Gulf (Florida to Alabama) and western Gulf (Texas to Louisiana), for those years when samples were available from the western region. There were however ALK for the whole Gulf region (coded GOM in tables and figures); of course, if there were only samples from the eastern Gulf, the ALKs for GOM and EGM were the same. Figure 32 presents box plot distribution of the size (fork length cm) of aged fish for the ALK, for males and females of each migratory group by year. Overall, females have larger sizes, for each group, and also show a greater range of sizes. Figure 33 presents the age-length relationship from the ALK as box plots for each age, migratory group and sex. The box width was proportional to the number of aged-fish. The largest size for females was about 130-140 cm fork length for both the Gulf and Atlantic stocks, for males the largest average size was about 110 cm.

Tables 35 through 42 present (albeit in small print) the current ALKs for king mackerel, each ALK table is order by age class [0 to 19] then by year [1986-2002] in the row direction, while the columns are the size bin (upper boundary in cm of fork length). Size bins are not the same size. The values in the table are the probability of fish $[p_i(Age_j)]$ for each size i in that particular age class j for each year. Thus, if for example the 65 cm size bin was selected, the sum of probabilities for all ages (0 to 19) for each

year was one.

For 1995,
$$\sum_{j=Age}^{Age} p_i (Age_j) = 1.00$$
 for i Min size bin to max size bin.

For the size bin boundaries (e.g. 35 or 200 cm) a value of $p_i(Age_j) = 1.0$ was added for the Ages 0 (i=35 cm), and for Age 19 (i=200 cm), in particular for those years where no samples were available to the bin size limits. Tables 34 and 35 show the ALK for Gulf king females and males, respectively. Tables 36 and 37 show the ALK for Atlantic king also by sex, and Tables 38-42 show the ALKs for Gulf king split by region, e.g. eastern Gulf and western Gulf by sex.

As mentioned above, the preferential method for aging the CAS by sex data is to use ALK; the alternative method is the stochastic length deconvolution method of Shepherd (1985). For king mackerel, the CAS by sex data were converted to Catch at age for each year, migratory group and quarter. For the Gulf stock, the CAS was also considered by region: eastern Gulf and western Gulf. Decision rule(s) on what method to use depended on whether ALKs were available for each migratory group (or region) in a given year, and if for each quarter of the year, the ALK was appropriate or not. The algorithms read a user defined instruction file that command the program at to which method to apply. The latest version of the instruction file for king mackerel is shown in Table 43, which was applied for the 2002 assessment of Gulf king and the 2003 assessment of Atlantic king. The aging protocols were applied for CAS by sex data from 1985-2001, for Gulf and Atlantic king mackerel. The age-structured VPA for both migratory groups started in 1981, thus CAA for 1981-1984 was in the prior(s) stock assessments, and not recalculated. In table 43 the KEY code refers to the use of ALK; the SAR code refers to the stochastic length deconvolution methods. In the Atlantic king, ALK were available from 1986 through 2001 for Quarters 2, 3 and 4 (April-December); stochastic method was primarily used for the catch in Quarter 1 (January-March). For the Gulf king, the VPA assessment was conducted for the whole Gulf; however, the CAA was generated for the Eastern and Western regions (only for 1986-1992), and then added together. The Eastern Gulf was aged primarily by ALK, with few exceptions in primarily Quarters 1 and 4. The Western Gulf was aged primarily by the stochastic method since 1994.

Figure 34 presents a summary of the proportions by age of the total catch from 1981 to the latest calendar year for the Gulf and Atlantic migratory groups. For both groups, the main bulk of the catch was from ages 1, 2, 3, 4 and 5. Also, the age distribution of the catch was somewhat different for the earlier years (ie. 1981-84 Atlantic king and 1981-85 for Gulf king), coincidentally the years prior to the aged samples or available ALK. For Gulf king also in 1998, there was a change in the age composition compared to prior or posterior years, with a significant reduction for ages 1 and 2, and an increased proportion for ages 3, 4 and 5.

Figure 35 shows the age distribution of catch by sector, commercial and recreational for Gulf king as available for the last stock assessment (2002). The recreational sector shows that main ages of catch were 2, 3, 4 and 5, at least from 1985 to 1999 (excluding 1998). While, for the commercial sector, the main catches were from ages 1, 2, 3, and 4.

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 $Table\ 1.\ King\ mackerel\ landings\ (pounds)\ by\ migratory\ group\ and\ sector\ from\ 1981\ to\ 2002.\ (2002\ data\ is\ provisional,\ and\ 2001-02\ recreational\ landings\ were\ provided\ in\ numbers\ of\ fish,\ but\ not\ converted\ to\ weight\ units.)$

Sum	of LB	STOCK	Sector				
		Atlantic		Atlantic Total	Gulf		Gulf Total
YR		Commercial	Recreational		Commercial	Recreational	
	1981	2,399,459	3,813,916	6,213,375	6,714,600	5,581,753	12,296,353
	1982	3,938,370	5,853,949	9,792,319	4,566,449	8,403,500	12,969,949
	1983	2,386,021	6,231,916	8,617,937	4,751,722	2,440,391	7,192,113
	1984	1,968,572	6,152,396	8,120,968	3,383,376	3,028,207	6,411,583
	1985	2,456,228	7,034,836	9,491,064	3,072,275	1,910,715	4,982,990
	1986	2,801,995	5,895,233	8,697,228	2,969,771	1,707,993	4,677,764
	1987	3,392,485	4,036,602	7,429,087	1,822,192	3,951,485	5,773,677
	1988	3,166,062	4,786,299	7,952,361	1,390,413	4,685,704	6,076,117
	1989	2,480,843	3,336,627	5,817,470	1,190,061	2,677,376	3,867,437
	1990	2,537,741	3,905,392	6,443,133	2,320,777	3,994,043	6,314,820
	1991	2,567,902	5,338,859	7,906,761	1,654,709	4,773,681	6,428,390
	1992	2,244,302	6,670,337	8,914,639	2,754,142	3,965,159	6,719,301
	1993	2,141,263	4,284,508	6,425,771	3,606,441	7,045,373	10,651,814
	1994	2,069,574	3,882,720	5,952,294	2,149,527	5,536,448	7,685,975
	1995	2,011,811	4,142,416	6,154,227	2,616,933	7,424,592	10,041,525
	1996	2,228,032	3,740,689	5,968,721	2,887,972	6,689,630	9,577,602
	1997	3,045,909	5,281,571	8,327,480	3,212,639	7,798,919	11,011,558
	1998	2,470,723	4,473,059	6,943,782	3,346,639	5,959,000	9,305,639
	1999	2,345,625	3,413,082	5,758,707	3,724,817	4,654,630	8,379,447
	2000	2,220,774	5,297,380	7,518,154	2,923,983	4,509,300	7,433,283
	2001	1,934,857	4,095,440	6,030,297	2,991,040		2,991,040
	2002	246,620	31,132	277,752	1,962,793		1,962,793

Table 2. King Atlantic commercial catch in weight units (pounds) by gear.

Year	Hook & Line	Gillnet	Trawl	Unknown	Haul seine	Purse seine	Drift gillnet
198	1 2022794	328227	46446	1992			
198	2 2991221	920379	14460	12310			
198	3 2060285	305117	9564	11055			
198	1899448	58923	7533	2668			
198	5 2333475	26326	10239	599			85589
198	2496660	19145	4469	3532			278189
198	7 2610318	39295	15081	4354	250		723187
198	3 1951661	300561	1816	15938		117577	778509
198	9 1759303	13008	5772	1216		7569	693975
199	2474517	52623	6987	3614			
199	1 2536791	25178	812	4393	728		
199	2 2205065	33094	1384	4759			
199	3 2104924	25797	10118	355	69		
199	4 2001024	62315	3489	2273	473		
199	5 1942059	62957	144	6651			
199	2168792	55928	1311	1889	112		
199	7 2638529	402616	1542	1960	237	1025	
199	3 2374174	89644	1453	5452			
199	9 2273268	68143	224	3905	85		
200	2081850	132957	826	5061	80		
200	1 1850966	73326	521	10044			
200	2 245527	592		501			

Table 3. King Gulf commercial catch in weight units (pounds) by gear.

Year		Hook & Lin	Gillnet	Purse seine	Γrawl	Unknown	Haul seine	Traps & po 0	Other	Beach sein
	1981	3440404	3274196		·					
	1982	2325897	2240552							
	1983	2821326	1928100		2296					
	1984	2131263	1251630	200	283					
	1985	2013731	1058544							
	1986	1425903	1511421	32397	50					
	1987	1453271	367877	899	145					
	1988	934648	455259	375	131					
	1989	1189159		902						
	1990	1854028	465647	1102						
	1991	1426095	228614							
	1992	2754142								
	1993	2097317	1417378			91746				
	1994	2020016	2599			126912				
	1995	2243400	373533							
	1996	2395831	492141							
	1997	2720502	491836			301				
	1998	2683589	654720			6807	1523			
	1999	2711403	1009135	166	108	3936	69			
	2000	2448619	410097		1026	64158	83			
	2001	2466484	455726	22	11	68684		77	21	15
	2002	1448876	330849		53462	71430			58016	160

Table 4. King Atlantic recreational catch in numbers of fish by mode.

Year	Shore	Private	Charter	Headboat	Prv-Chr	Total
1981	-	153,400	-	=	263,048	416,448
1982	-	401,126	-	-	208,608	609,734
1983	-	442,928	-	-	226,581	669,509
1984	2,814	403,206	-	-	208,092	614,112
1985	-	269,152	-	-	536,948	806,100
1986	23,232	441,559	189,615	28,183	1,484	684,073
1987	1,570	336,796	199,571	29,424	-	567,361
1988	8,470	307,732	207,668	22,066	304	546,240
1989	5,194	180,949	156,086	24,017	2,492	368,738
1990	17,350	266,131	152,732	27,861	220	464,294
1991	12,600	340,933	195,073	41,292	500	590,398
1992	1,620	400,023	289,246	23,172	1,752	715,813
1993	3,048	194,201	139,130	21,641	-	358,020
1994	10,418	183,700	177,766	25,079	838	397,801
1995	3,426	196,292	245,015	18,703	892	464,328
1996	1,714	166,814	162,999	31,573	1,824	364,924
1997	9,836	230,961	268,948	18,658	1,000	529,403
1998	74,056	187,731	169,136	16,260	1,964	449,147
1999	2,890	216,972	119,432	19,961	370	359,625
2000	2,408	395,354	132,313	19,988	-	550,063
2001	4,866	236,648	85,911	12,485	-	339,910
2002	-	801	1,144	71	-	2,016

Table 5. King Gulf recreational catch in numbers of fish by mode.

Year	Shore	Private	Charter	Headboat	Prv-Chr	Total
1981	81,084	368,506	-	-	218,060	667,650
1982	23,100	680,164	21,476	3,218	183,768	911,726
1983	32,058	217,848	21,476	3,218	49,675	324,275
1984	828	340,458	3,862	7,558	48,006	400,712
1985	-	116,328	4,074	7,000	68,946	196,348
1986	5,862	155,077	43,365	17,228	-	221,532
1987	42,824	315,498	144,449	44,192	-	546,963
1988	23,838	268,402	171,220	11,642	-	475,102
1989	9,818	240,543	93,620	20,469	-	364,450
1990	124,216	264,791	141,068	32,870	-	562,945
1991	125,524	396,237	175,455	30,571	-	727,787
1992	54,086	244,205	163,978	30,079	-	492,348
1993	63,930	250,735	346,102	34,082	-	694,849
1994	67,512	193,908	356,936	35,836	-	654,192
1995	16,626	225,044	378,229	35,026	-	654,925
1996	7,704	177,114	508,931	39,338	-	733,087
1997	14,222	291,291	393,640	41,796	-	740,949
1998	6,504	197,695	387,682	31,126	-	623,007
1999	25,218	185,970	293,910	28,503	-	533,601
2000	31,034	230,857	240,278	28,503	-	530,672
2001	51,842	184,500	282,005	26,441	-	544,788
2002	33,578	103,737	142,419	10,161	-	289,895

Table 6. Distribution by region of commercial Atlantic king catch (pounds).

Year	F	LE	NC	SC & GA	North NC	Total
	1981	1,515,153	736,073	145,499	2,734	2,399,459
	1982	2,526,641	1,207,108	190,493	14,128	3,938,370
	1983	1,355,805	843,311	180,209	6,696	2,386,021
	1984	1,032,149	757,573	175,482	3,368	1,968,572
	1985	1,434,721	833,321	178,295	9,891	2,456,228
	1986	1,495,226	1,006,057	297,003	3,709	2,801,995
	1987	1,827,807	1,348,443	200,016	16,219	3,392,485
	1988	2,110,287	886,302	154,338	15,135	3,166,062
	1989	1,569,368	720,237	182,907	8,331	2,480,843
	1990	1,210,584	1,130,699	180,073	16,385	2,537,741
	1991	1,152,885	1,102,794	290,206	22,017	2,567,902
	1992	909,926	1,034,583	268,638	31,155	2,244,302
	1993	1,061,221	887,664	171,890	20,488	2,141,263
	1994	1,119,450	849,666	99,207	1,251	2,069,574
	1995	894,369	1,013,188	93,845	10,409	2,011,811
	1996	1,330,934	793,593	98,981	4,524	2,228,032
	1997	1,403,125	1,558,380	68,870	15,534	3,045,909
	1998	1,244,396	1,143,223	78,357	4,747	2,470,723
	1999	1,182,547	1,082,667	75,233	5,178	2,345,625
	2000	1,082,518	1,046,612	82,748	8,896	2,220,774
	2001	1,045,798	832,065	56,093	901	1,934,857
	2002	2,195	243,049	1,376	-	246,620

Table 7. Distribution by region of commercial Gulf king catch (pounds).

Year		AL MS	FL E	FL W	LA	TX	Total
	1981		3,535,038	3,179,562			6,714,600
	1982		2,302,529	2,034,734	229,186		4,566,449
	1983	2,373	1,876,262	1,383,548	1,489,539		4,751,722
	1984	3,589	1,499,869	1,131,214	747,538	1,166	3,383,376
	1985	3,029	1,304,657	791,265	969,665	3,659	3,072,275
	1986	1,419	933,173	1,699,174	334,344	1,661	2,969,771
	1987	4,099	796,705	490,264	527,960	3,164	1,822,192
	1988	9,221	418,652	509,187	446,962	6,391	1,390,413
	1989	4,384	313,336	219,001	651,883	1,457	1,190,061
	1990	1,852	751,219	930,575	635,809	1,322	2,320,777
	1991	977	523,382	547,745	582,189	416	1,654,709
	1992	10,862	573,464	1,037,599	1,090,795	41,422	2,754,142
	1993	2,158	588,632	2,115,598	808,307	91,746	3,606,441
	1994	5,450	588,177	682,814	746,174	126,912	2,149,527
	1995	3,218	766,170	1,092,206	583,953	171,386	2,616,933
	1996	4,001	679,189	1,471,792	583,392	149,598	2,887,972
	1997	4,608	1,168,404	1,251,009	521,758	266,860	3,212,639
	1998	3,672	929,426	1,244,438	842,778	326,325	3,346,639
	1999	3,189	873,816	1,759,702	837,679	250,431	3,724,817
	2000	3,716	779,279	1,109,415	948,710	82,863	2,923,983
	2001	19,362	798,899	1,335,334	794,528	42,917	2,991,040
	2002	3,866	493,225	961,955	503,747		1,962,793

Table 8. Distribution by region of recreational Atlantic king catch (pounds).

Year	FL E	NC	SC & GA	North NC	Total
1981	1,054,154	2,558,088	173,546	28,128	3,813,916
1982	3,326,305	1,977,652	549,992	-	5,853,949
1983	3,022,886	1,812,326	1,396,704	-	6,231,916
1984	2,476,134	2,938,510	737,752	-	6,152,396
1985	1,917,242	3,565,922	1,549,858	1,814	7,034,836
1986	1,552,996	1,789,870	2,474,815	77,552	5,895,233
1987	1,201,183	1,974,777	812,036	48,606	4,036,602
1988	1,409,445	1,797,339	1,457,949	121,566	4,786,299
1989	1,375,269	1,040,154	849,406	71,798	3,336,627
1990	1,880,458	1,297,652	713,630	13,652	3,905,392
1991	2,051,522	1,701,256	1,493,395	92,686	5,338,859
1992	2,661,442	1,393,668	2,514,905	100,322	6,670,337
1993	2,068,895	1,274,232	721,967	219,414	4,284,508
1994	1,762,212	1,199,672	896,878	23,958	3,882,720
1995	2,264,811	1,121,625	748,146	7,834	4,142,416
1996	2,323,465	763,138	632,360	21,726	3,740,689
1997	2,518,737	1,906,491	728,199	128,144	5,281,571
1998	2,142,606	1,112,873	1,154,064	63,516	4,473,059
1999	2,345,593	742,951	298,744	25,794	3,413,082
2000	2,806,632	1,691,607	625,861	173,280	5,297,380
2001	1,970,689	1,686,302	391,783	46,666	4,095,440
2002	-	25,153	5,979	-	31,132

Table 9. Distribution by region of recreational Gulf king catch (pounds).

Year		AL MS	FL E	FL W	LA	TX	Total
	1981	373,948	469,051	2,204,592	354,386	2,179,776	5,581,753
	1982	5,887,398	782,348	603,106	580,536	550,112	8,403,500
	1983	133,010	83,093	1,123,512	478,234	622,542	2,440,391
	1984	543,394	479,057	1,537,594	167,192	300,970	3,028,207
	1985	731,028	161,733	498,212	99,078	420,664	1,910,715
	1986	255,272	234,701	810,442	94,003	313,575	1,707,993
	1987	419,188	524,676	2,439,067	110,411	458,143	3,951,485
	1988	713,932	1,004,822	2,481,446	152,317	333,187	4,685,704
	1989	188,576	443,254	1,638,971	50,485	356,090	2,677,376
	1990	570,874	937,167	2,043,914	3,234	438,854	3,994,043
	1991	347,132	606,636	3,431,151	30,058	358,704	4,773,681
	1992	370,648	760,276	1,979,071	149,276	705,888	3,965,159
	1993	505,880	1,934,471	3,596,292	58,745	949,985	7,045,373
	1994	439,152	760,253	3,893,682	120,372	322,989	5,536,448
	1995	602,966	1,454,867	4,942,081	97,152	327,526	7,424,592
	1996	316,364	994,753	4,969,385	60,333	348,795	6,689,630
	1997	801,494	1,774,227	4,436,678	183,722	602,798	7,798,919
	1998	363,026	1,216,771	3,507,817	62,423	808,963	5,959,000
	1999	415,048	1,093,376	2,544,454	51,708	550,044	4,654,630
:	2000	862,748	737,445	2,294,235	87,480	527,392	4,509,300
	2001						-
	2002						-

Table 10. Percent distribution of commercial catch for king mackerel by gear and subareas for 1995 to 2002*.

Sector | Commerci | King Mackerel 95-02 Catch % (of year total

King Mackerel 95-02 Catch % (of year total wgt) by Gear and Area for the Atlantic & Gulf Stocks

Sum of WgtCat		Stock	year														
	9	Atlantic	,							Gulf							
Gear	NewAr	1995	1996	1997	1998	1999	2000	2001	2002	1995	1996	1997	1998	1999	2000	2001	2002
BCHSEI	FL-Keys, Monroe																
	FL-NE, Nassau-Flagler																
	FL-NW, Citrus-Escambia																
	FL-SE, Volusia-Dade																
	FL-SW, Collier-Hernando																
	North Carolina																
GILLNT	Alabama and Mississippi																
	FL-Keys, Monroe									14.27%	13.38%	13.43%	18.75%	23.26%	11.50%	13.43%	16.26%
	FL-NE, Nassau-Flagler																
	FL-NW, Citrus-Escambia			= 000/													
	FL-SE, Volusia-Dade			7.28%				1.27%									
	FL-SW, Collier-Hernando		0.000/	= =00/	0.050/	4 = 40/	. ===./	0.450/	= 0=0/		3.66%	1.74%		4.03%	1.93%	1.68%	
	North Carolina	2.89%	2.39%	5.52%	2.65%	1.71%	4.75%	2.45%	5.87%								
1101	North of NC																
H&L	Alabama and Mississippi FL-E, Nassau-Dade (MRFSS)																
	FL-E, Nassau-Dade (MRF55) FL-Keys, Monroe	2.12%	0.050/	1.16%	6.00%		1.09%	2.82%	2.20%	20.93%	23.95%	8.73%	8.99%	9.07%	11.99%	45 000/	23.07%
	FL-NE, Nassau-Flagler	1.99%	8.65% 2.50%	1.60%	2.56%		1.52%	1.60%	2.20%	20.93%	23.95%	0.73%	0.99%	9.07%	11.99%	15.63%	23.07%
	FL-NW, Citrus-Escambia	1.99%	2.50%	1.00%	2.56%		1.52%	1.00%		3.38%	7.81%	13.54%	6.55%	6.90%	7.10%	7.45%	1.78%
	FL-SE, Volusia-Dade	40.14%	48.58%	35.99%	40.73%	47.39%	45.03%	47.80%	44.88%	29.28%	23.52%	36.23%	27.99%	23.43%	26.57%	26.43%	24.96%
	FL-SW, Collier-Hernando	40.1476	40.30 %	33.99 /6	40.7376	47.3976	45.05%	47.00%	44.00 /0	3.14%	23.32 %	1.50%	1.98%	3.78%	4.88%	4.32%	3.83%
	Louisiana									22.31%	20.20%	16.24%	25.45%	22.51%	32.53%	26.56%	19.99%
	North Carolina	47.40%	33.14%	45.59%	43.56%	44.44%	42.34%	40.52%	42.77%	22.5170	20.2076	10.24 /0	23.4370	22.5176	32.3370	20.5070	13.3370
	North of NC	47.4070	33.1470	40.0070	43.3070	44.4470	72.5770	40.5270	72.7770								
	South Carolina and Georgia	4.66%	4.44%	2.26%	3.17%	3.21%	3.72%	2.90%	2.84%								
	Texas	1.0070	1.1170	2.2070	0.1770	0.2170	0.1270	2.0070	2.0170	6.55%	5.18%	8.31%	9.85%	6.73%	2.84%	1.43%	
PURSEI	FL-Keys, Monroe	†								0.00,0			*******				
	FL-SE, Volusia-Dade																
	FL-SW, Collier-Hernando																
TRAWL	Alabama and Mississippi																
	FL-Keys, Monroe																
	FL-NE, Nassau-Flagler																
	FL-NW, Citrus-Escambia																
	FL-SE, Volusia-Dade																
	FL-SW, Collier-Hernando																
	Louisiana																2.72%
	North Carolina																
	North of NC																
	South Carolina and Georgia																
UNK	Alabama and Mississippi																
	FL-Keys, Monroe															1.62%	3.35%
	FL-NE, Nassau-Flagler																
	FL-NW, Citrus-Escambia	1															
	FL-SE, Volusia-Dade	1															
	FL-SW, Collier-Hernando	1															
	Louisiana	1															2.96%
	North Carolina	1															
One and To	North of NC	400.000/	400.0001	400.0001	400.000′	400.0001	400.000′	400.0001	400.000/	400.0007	400.000′	400.000′	400.000′	400.0001	400.000′	400.0007	400.000/
Grand To	ldi	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Total Catch (wgt) for Comm Item shows only catch > 1%

m 2012224 2228298 3046378 2471125 2345978 2221501 1935392 1394150 2617043 2888039 3212846 3311804 3721700 2916290 2991040 1962793

Table 11. Percent distribution of recreational catch for king mackerel by subareas for 1996 to 2002*.

Sector	Recreatn	King Mackerel 95-02 Catch % (of year total Numb) by Gear and Area for the Atlantic & Gulf Stocks
000001	rtooroutii	Time machine of the cation is (or your total name) by ocal and rice for the relations a can become

Sum of N	NumCat	Stock	year														
		Atlantic								Gulf							
Gear	NewAr	1995	1996	1997	1998	1999	2000	2001	2002	1995	1996	1997	1998	1999	2000	2001	200
RECH&L	Alabama and Mississippi									11.05%	5.73%	13.23%	6.83%	9.19%	20.31%	14.77%	8.309
	FL-E, Nassau-Dade (MRFSS)	57.05%	52.98%	40.74%	46.97%	65.03%	57.42%	54.41%		17.14%	12.92%	18.89%	18.36%	25.43%	13.06%	13.05%	12.209
	FL-Keys, Monroe																
	FL-NE, Nassau-Flagler																
	FL-NW, Citrus-Escambia																
	FL-SE, Volusia-Dade	3.26%	7.87%	2.51%	2.55%	4.72%	2.57%	2.47%		1.59%	2.12%	2.19%	2.02%	1.50%	1.93%		1.259
	FL-SW, Collier-Hernando																
	FL-W, Collier-Escambia																
	FL-W, Monroe-Escambia (MRF									63.13%	72.67%	55.67%	59.60%	53.42%	55.03%	62.09%	74.289
	Louisiana									1.34%		2.18%			1.45%		
	North Carolina	24.79%	20.90%	37.66%	22.55%	21.37%	25.12%	33.59%	78.86%								
	North of NC			3.05%	1.42%		3.59%	1.31%									
	South Carolina and Georgia	14.42%	17.37%	15.78%	26.31%	7.80%	11.12%	7.77%	20.30%								
	Texas									5.06%	4.93%	7.01%	11.65%	9.27%	7.83%	8.25%	2.569
Grand To	otal	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.009
	_																
	Total Catch (fish) for Recreational	464347	364967	529465	449264	359696	550105	339989	2044	654994	733161	741014	623136	533734	536054	544763	28988

Item shows only catch > 1%

Table 12. Percent catch distribution by subarea and month* for Gulf king mackerel of the Commercial sector.

Gulf Stock
Gulf King Mackerel % catch* by month for each area of the commercial fishery

Commercial Sector		V							
King Mackerel Area	Month	Year 1995	1996	1997	1998	1999	2000	2001	200
Alabama and Mississippi	Apr	1990	1990	1331	1990	1333	2000	2001	200
madama ana mississippi	Jun								
	Jul	58.5%	73.4%	98.0%	81.0%	73.5%	36.5%	16.5%	70.99
	Aug	32.0%	18.8%		18.8%	26.5%	11.1%	46.2%	27.29
	Sep	7.9%	7.8%					34.6%	
	Oct						52.1%		
	Nov								
Alabama and Mississippi Sum	Total lbs	3218	4001	4621	3716	3189	3734	19362	386
	% of Total	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.6%	0.29
FL-NW, Citrus-Escambia	Jan								
	Feb								
	Mar								
	Apr								
	May Jun								5.29
	Jul	19.2%	5.3%	6.0%		10.4%	17.9%	10.2%	73.79
	Aug	9.3%	5.4%	0.070	6.8%	6.4%	8.4%	8.1%	10.39
	Sep	15.2%	18.0%	8.0%	6.0%	7.2%	8.1%	9.4%	8.39
	Oct	9.0%	40.4%	56.8%	22.2%	32.3%	39.7%	44.7%	0.07
	Nov	11.7%	16.9%	23.6%	45.7%	39.8%	25.2%	26.8%	
	Dec	34.5%	12.5%		14.8%				
FL-NW, Citrus-Escambia Sum	Total lbs	88541	225688	434994	216799	260749	208784	234037	3745
	% of Total	3.4%	7.8%	13.5%	6.5%	7.0%	7.2%	7.8%	1.99
FL-SE, Volusia-Dade	Jan	21.5%	21.0%	21.3%	19.5%	21.2%	17.1%	24.7%	58.4%
	Feb	15.5%	29.2%	14.3%	15.6%	37.6%	18.4%	25.0%	15.5%
	Mar	19.8%	6.5%	17.1%	10.2%	20.2%	33.8%	17.2%	26.19
	Nov	15.6%	7.2%	19.4%	30.0%	,	18.4%	5.9%	
EL CE Valuaia Dada Corre	Dec Total lbs	27.6%	36.1%	27.9%	24.7%	17.8%	12.3%	27.2%	40000
FL-SE, Volusia-Dade Sum	Total lbs	766170	679189	1168437	929789	874145	778592	798899 26.7%	49322
FL-Keys, Monroe	% of Total Jan	29.3% 32.4%	23.5% 15.9%	36.4% 77.1%	28.1% 40.6%	23.5% 86.5%	26.7% 44.1%	67.4%	25.19 57.09
rt-Reys, Monioe	Feb	54.6%	55.0%	12.2%	43.5%	7.3%	34.2%	24.0%	23.29
	Mar	7.0%	6.9%	12.2/0	9.4%	1.570	12.8%	24.070	19.89
	Nov	7.070	0.570		3.470		12.070		13.07
	Dec		21.4%	7.6%			6.8%	6.1%	
FL-Keys, Monroe Sum	Total lbs	921407	1078244	712138	924969	1204614	694986	917563	83781
• •	% of Total	35.2%	37.3%	22.2%	27.9%	32.4%	23.8%	30.7%	42.79
FL-SW, Collier-Hernando	Jan			54.8%		63.5%	64.5%	17.4%	21.79
	Feb	10.3%	62.9%			9.7%	20.2%	42.4%	56.7%
	Mar					8.0%			11.6%
	Apr	13.0%	12.2%		16.4%				6.0%
	May								
	Jun								
	Jul								
	Aug								
	Sep Oct				8.8%				
	Nov	24.9%		12.1%	19.4%			13.3%	
	Dec	45.8%	19.1%	24.4%	49.8%	9.3%	7.0%	17.0%	
FL-SW, Collier-Hernando Sum	Total lbs	82290	167923	104010	67398	290813	198612	183734	8669
	% of Total	3.1%	5.8%	3.2%	2.0%	7.8%	6.8%	6.1%	4.49
Louisiana	Feb	0.1.70	3.070	31270	7.3%	. 10 / 0	3.0,0	51170	/
	Mar				12.9%				
	Apr								
	May								
	Jun								
	Jul	60.1%	58.9%	88.5%	52.7%	58.1%	60.7%	31.6%	58.2%
	Aug	29.2%	37.6%	11.4%	27.0%	41.4%	39.2%	25.6%	41.89
	Sep	10.2%						14.7%	
	Oct							10.5%	
	Nov							17.6%	
Louisiana Cu	Dec	F00000	E00000	E04750	040770	007750	040740	70.4500	E0074
Louisiana Sum	Total lbs	583960	583392	521758	842778	837759	948719	794528	50374
Texas	% of Total Jan	22.3%	20.2%	16.2%	25.4%	22.5%	32.5%	26.6%	25.7%
. 0,00	Feb								
	Mar				17.8%				
	May				11.070				
	Jun								
	Jul	76.6%	61.4%	95.2%	45.5%	65.5%	74.0%	67.3%	
	Jui				33.6%	34.4%	25.0%	19.9%	
	Aug	19.5%	38.4%						
		19.5%	30.4%		00.070			12.8%	
	Aug	19.5%	30.4%		00.070				
	Aug Sep	19.5%	30.4%		00.070				
	Aug Sep Oct	19.5%	30.4%		30.070				
Fexas Sum	Aug Sep Oct Nov	19.5% 171457	149602	266888	326355	250431	82863		

^{*} Items show only those of 5% or more

Table 13. Percent catch distribution by subarea and month for Atlantic king mackerel commercial sector

Atlantic Stock Atlantic King Mackerel % catch* by month for each area of the commercial fishery

Commercial sector King Mackerel		Year							
Area	Month	1995	1996	1997	1998	1999	2000	2001	2002
North of NC	Jan								
	Feb								
	Mar					14.1%			
	Apr		18.5%						7.2%
	May								
	Jun	75.2%	46.9%		6.8%	6.2%	21.9%	41.4%	25.5%
	Jul	7.9%		74.6%	42.2%	17.9%	24.6%	14.2%	8.29
	Aug		40.70/	8.1%	8.4%	8.3%	20.6%	6.8%	40.00
	Sep Oct	9.3%	12.7% 16.2%	5.6% 5.0%	26.4% 11.5%	12.2% 39.1%	24.0%	25.8%	40.9% 14.3%
	Nov	9.5/6	10.2 /0	3.0 %	11.576	39.170		5.6%	14.37
	Dec							3.076	
North of NC Sum	Total lbs	10527	4641	15555	4908	5319	9080	1076	88
riorar or rio Gain	% of Total	0.5%	0.2%	0.5%	0.2%	0.2%	0.4%	0.1%	0.19
North Carolina	Jan	12.2%	10.5%	010 70	8.3%	21.7%	10.7%	01170	7.89
	Feb			10.9%		5.4%	5.5%	8.6%	9.0%
	Mar	17.2%	6.6%	29.6%	11.5%	7.2%	8.4%	5.3%	18.9%
	Apr	6.4%	14.4%	8.4%	8.1%		6.8%	14.2%	5.4%
	May								
	Jun								
	Jul								
	Aug	I							
	Sep	10.00/	22.70/	4.4.70/	1 4 407	0.007	04 70/	16 50/	20.00
	Oct	18.0% 20.8%	23.7%	14.7%	14.4%	9.2%	21.7%	16.5%	20.89
	Nov Dec	13.4%	27.8% 5.6%	21.5%	41.6% 5.9%	22.9% 23.5%	30.9%	19.9% 20.8%	30.8%
North Carolina Sum	Total lbs	1013413		5.6% 1558530		1082694	1046808	832286	679978
North Carolina Sum	% of Total	50.4%	35.6%	51.2%	46.3%	46.2%	47.1%	43.0%	48.89
South Carolina and Georgia	Jan	30.470	33.070	31.270	9.8%	9.5%	6.9%	40.070	40.07
Court Carolina and Coorgia	Feb			6.3%	0.070	0.070	0.070		
	Mar			7.3%					
	Apr	5.5%	9.6%	5.0%	5.7%			9.6%	10.1%
	May	5.1%	6.5%	5.7%	16.8%	7.7%	6.5%	6.4%	
	Jun	12.4%	5.4%	8.1%	12.7%	9.7%	11.3%	10.4%	7.9%
	Jul	18.3%		13.8%		12.8%	13.0%	14.7%	28.3%
	Aug	5.8%	15.7%	7.8%	6.9%	14.2%	18.5%	24.6%	30.8%
	Sep	6.3%		6.1%	5.3%		8.9%	7.9%	
	Oct	10.0%	13.2%	17.6%	11.9%	6.7%	7.1%	6.3%	9.7%
	Nov	13.9%	20.9%	14.9%	17.0%	17.5%	13.4%	8.6%	
County Counting and Counting C	Dec	16.9%	16.7%	5.3%	5.9%	9.2%	6.7%	6.9%	2075
South Carolina and Georgia S		93915	99015 4.4%	68902 2.3%	78368	75256 3.2%	82797 3.7%	56156 2.9%	39757
FL-E, Nassau-Dade (MRFSS)	% of Total Jun	4.7% 84.1%	4.4/0	2.3/0	3.2%	3.2/0	3.7 /0	2.9/0	2.9%
TEE, Nassau Dade (WIN 66)	Jul	15.9%							
FL-E, Nassau-Dade (MRFSS)		3835							
,,	% of Total	0.2%							
FL-NE, Nassau-Flagler	Jan		8.9%	10.4%	17.2%	12.1%	11.5%	22.4%	13.2%
	Feb		26.0%	19.6%	17.2%		7.4%	5.9%	8.1%
	Mar	12.6%		8.7%	25.9%	7.9%	12.4%	7.0%	9.1%
	Apr	6.6%							27.5%
	May	5.0%				6.7%	5.7%	6.2%	
	Jun	8.3%		8.7%	6.8%	14.2%	6.2%	9.7%	25.19
	Jul	9.7%	9.0%	12.3%	6.3%	10.7%	8.5%	17.6%	5.6%
	Aug			10.3%		8.5%	8.0%	7.7%	5.5%
	Sep							10.2%	
	Oct	0.00/		E 00/	12 20/		1/1 20/	g 20/	
	Nov Dec	9.9% 39.4%	36.4%	6.0% 15.4%	12.2% 6.5%	29.5%	14.3% 21.2%	8.2%	
FL-NE, Nassau-Flagler Sum	Total lbs	40113	55717	48981	63303	23112	36740	31880	723
/+_, /+assau / layler sulli	% of Total	2.0%	2.5%	1.6%	2.6%	1.0%	1.7%	1.6%	0.5%
FL-SE, Volusia-Dade	Apr	21.1%	11.2%	21.0%	18.0%	27.6%	24.4%	18.3%	35.2%
_ ,	May	41.3%	36.0%	37.3%	25.4%	36.3%	27.6%	27.6%	35.3%
	Jun	15.4%	17.6%	10.1%	13.2%	11.1%	12.7%	14.7%	14.5%
	Jul	7.4%	8.4%	9.5%	13.1%	7.1%	11.0%	15.8%	10.09
	Aug	8.5%	16.1%	13.6%	12.1%	11.2%	13.9%	15.2%	
	Sep		5.9%		7.7%	5.4%	6.2%	5.7%	
	Oct				10.5%				
FL-SE, Volusia-Dade Sum	Total lbs			1319117				957655	63524
	% of Total	40.1%	48.6%	43.3%	41.7%	48.5%	46.0%	49.5%	45.6%
FL-Keys, Monroe	Apr	51.1%	89.7%	39.8%	84.1%	32.5%	41.7%	73.8%	82.69
	May	20.4%		14.9%		24.0%	15.4%		6.49
	Jun	5.8%		6.3%		8.7%	8.8%		5.7%
	Jul	I		5.5%		7.1%	5.6%		
	Aug	0.007		11.6%		5.9%	7.5%		
	Sep	6.2%		8.2%		10.0%	6.5%	7.00/	
	Oct Total lbs	7.7% 42628	192809	13.6% 35293	151179	11.8% 20962	14.4% 24509	7.8% 56339	3104
EL-Kave Monroe Sum			12/009	.7:7/9.5	1011/9	ZU90Z	74009		o 1U4
FL-Keys, Monroe Sum	% of Total	2.1%	8.7%	1.2%	6.1%	0.9%	1.1%	2.9%	2.29

^{*} Items show only those of 5% or more

Table 14. Percent catch distribution by subarea and month* for Gulf king mackerel recreational sector.

Catch Numbers Area	Bymonth	Year 1995	1996	1997	1998	1999	2000	2001	2002
Area FL-E, Nassau-Dade (MRFSS)	Jan-Feb	30%	23%	36%	33%	33%	41%	43%	49%
FL-E, Nassau-Daue (MKF33)	March	15%	25%	16%	23%	23%	32%	32%	51%
	Nov-Dec	55%	52%	48%	43%	44%	27%	25%	317
FL-E, Nassau-Dade (MRFSS) Sum		112279	94714	139943	114416	135733	69982	71068	35374
,	% of G Total	17.14%	12.92%	18.89%	18.36%	25.43%	13.06%	13.05%	12.20%
FL-SE, Volusia-Dade	Jan-Feb	39%	20%	30%	31%	23%	42%	52%	76%
	March	29%	8%	18%	27%	10%	21%	17%	24%
	Nov-Dec	32%	72%	52%	42%	67%	37%	32%	
FL-SE, Volusia-Dade Sum		10442	15523	16240	12602	7984	10350	5294	362
	% of G Total								
FL-Keys, Monroe	Jan-Feb	66%	44%	72%	77%	65%	64%	40%	50%
	March	22%	30%	11%	11%	000/	7%	40%	50%
FI 1/ 11 0	Nov-Dec	12%	26%	17%	12%	30%	29%	20%	400
FL-Keys, Monroe Sum	0/ of C Total	2911	4033	4135	3953	1206	796	1733	1389
FL-SW, Collier-Hernando	% of G Total Jan-Feb			6%					79
FL-3W, Collier-Hernando	March	10%		38%		11%	11%	11%	179
	April	20%	9%	22%	18%	29%	29%	29%	449
	May-Jun	2076	5%	22%	10%	21%	21%	21%	329
	Jul-Aug	8%	376	22 /0	10%	15%	15%	15%	32/
	Sep-Oct	50%		6%	19%	8%	8%	8%	
	Nov-Dec	6%	81%	7%	41%	11%	11%	11%	
FL-SW, Collier-Hernando Sum	.107 200	124	788	72	141	62	62	62	4
C.T., Comor Floridado Guill	% of G Total	124	700	12	ודו	02	02	02	-
FL-NW, Citrus-Escambia	March								
.,	April	14%	7%			6%	6%	6%	19%
	May-Jun	30%	28%	25%	22%	24%	24%	24%	80%
	Jul-Aug	35%	31%	28%	45%	43%	43%	43%	
	Sep-Oct	21%	33%	44%	27%	23%	23%	23%	
	Nov-Dec								
FL-NW, Citrus-Escambia Sum		1447	1265	1932	1194	1218	1218	1218	367
	% of G Total								
FL-W, Collier-Escambia	Jan-Feb				18%	8%	8%	8%	25%
	March					6%	6%	6%	19%
	April				9%				13%
	May-Jun				18%	14%	14%	14%	44%
	Jul-Aug				18%	36%	36%	36%	
	Sep-Oct				18%				
	Nov-Dec			98%	18%	32%	32%	32%	
FL-W, Collier-Escambia Sum				42	11	50	50	50	16
	% of G Total								
FL-W, Monroe-Escambia (MRF	Jan-Feb	33%	21%	32%	29%	16%	8%	17%	31%
	March	41%	27%	14%	21%	21%	11%	17%	25%
	May-Jun	8%	17%	8%	8%	15%	18%	15%	45%
	Jul-Aug		14%	9%	16%	18%	34%	27%	
	Sep-Oct	400/	13%	21%	12%	15%	17%	13%	
FL-W, Monroe-Escambia (MRF Su	Nov-Dec	10% 413496	8% 532760	16% 412522	14%	14% 285136	13% 294979	9% 338220	215315
rt-w, Montoe-Escambia (MRF Su	% of G Total	63.13%			371380				74.28%
Alabama and Mississippi	March	5%	72.67%	55.67%	59.60%	53.42%	55.03%	62.09% 5%	16%
πιαραπία απα ινποοιοοιρμί	May-Jun	42%	25%	25%	27%	51%	20%	5% 7%	84%
	Jul-Aug	24%	43%	25% 35%	47%	18%	40%	32%	047
	Sep-Oct	28%	31%	36%	20%	21%	11%	31%	
	Nov-Dec	20 /0	J 1 /0	50 /0	2070	9%	27%	24%	
Alabama and Mississippi Sum		72394	42025	98016	42583	49040	108850	80476	2404
	% of G Total	11.05%	5.73%	13.23%	6.83%	9.19%	20.31%	14.77%	8.30%
Louisiana	Jan-Feb		6%	. 3.2370	18%	3370	34%	6%	16%
	March		0,0		1070		8%	0,0	32%
	April		6%				0,0		02/
	May-Jun	38%	3,0	30%	20%	14%	7%	32%	51%
	Jul-Aug	55%	8%	51%	19%	63%	46%	37%	,
	Sep-Oct	2070	54%	12%	12%	18%	. 3 / 0	18%	
	Nov-Dec		24%	7%	30%				
Louisiana Sum		8782	5910	16190	4289	3845	7784	1719	2289
	% of G Total								
Texas	Jan-Feb								
	March								
	April	6%	5%						
	May-Jun	13%	25%	19%	27%	12%	13%	15%	899
	Jul-Aug	64%	49%	66%	64%	81%	76%	70%	
	Sep-Oct	17%	22%	9%	6%		8%	13%	
	Nov-Dec								
	1	33119	36143	51922	72567	49460	41983	44923	742
Texas Sum		33113							
Texas Sum	% of G Total	5.06%	001.10	7.01%	11.65%	9.27%	7.83%	8.25%	

Table 15. Percent catch distribution by subarea and month* for Atlantic king mackerel recreational sector

Catch Numbers		Year							
Area	Bymonth	1995	1996	1997	1998	1999	2000	2001	2002
FL-E, Nassau-Dade (MRFSS)	April	6%	12%	10%	13%	13%	7%	12%	
	May-Jun	35%	36%	39%	47%	41%	25%	44%	
	Jul-Aug	26%	41%	37%	27%	32%	51%	33%	
	Sep-Oct	33%	11%	13%	14%	13%	16%	11%	
FL-E, Nassau-Dade (MRFSS) Sum		264917	193355	215727	211015	233917	315868	184984	
, ,	% of G Total	57%	53%	41%	47%	65%	57%	54%	
FL-SE, Volusia-Dade	April	20%	9%	35%	17%	8%	16%	16%	
,	May-Jun	28%	23%	27%	24%	14%	23%	22%	
	Jul-Aug	13%	19%	16%	16%	6%	17%	24%	
	Sep-Oct	39%	50%	23%	43%	72%	44%	38%	
FL-SE, Volusia-Dade Sum		15126	28728	13309	11456	16979	14119	8397	
,	% of G Total		8%						
FL-Keys, Monroe	April	14%		8%	9%	8%	7%	11%	
	May-Jun	38%	37%	21%	33%	32%	14%	24%	
	Jul-Aug	14%	34%	31%	35%	18%	10%	29%	
	Sep-Oct	34%	28%	39%	24%	43%	69%	36%	
FL-Keys, Monroe Sum	300 000	1131	1303	1316	822	364	520	1390	
l Litteys, Monioe oun	% of G Total	1131	1303	1310	OZZ	304	320	1330	
FL-NE, Nassau-Flagler	Jan-Feb								35%
FL-NE, Nassau-Flaglei	March							8%	65%
	April	31%	55%			6%		10%	0376
	May-Jun	21%	6%	23%	24%	52%	36%	27%	
	Jul-Aug	14%	36%	67%	9%	32%	32%	49%	
	Sep-Oct	33%		10%	26%	6%	12%		
FL-NE, Nassau-Flagler Sum	Nov-Dec	215	67	30	39% 96	195	10% 470	142	17
FL-NE, Nassau-Flagier Sum	% of G Total	215	67	30	96	195	470	142	17
North Carolina	Jan-Feb								
INOTHI Carollila	March	8%	12%	22%	15%	5%			98%
		0%	1270	22%	15%	5% 5%			90%
	April	440/	050/	450/			000/	040/	
	May-Jun	11%	25%	15%	22%	20%	26%	31%	
	Jul-Aug	30%	16%	13%	9%	30%	16%	18%	
	Sep-Oct	36%	37%	42%	22%	22%	36%	36%	
	Nov-Dec	15%	9%	7%	17%	17%	16%	6%	
North Carolina Sum	0/ /OT / I	115125	76279	199402	101288	76878	138205	114211	1612
11 (110	% of G Total	25%	21%	38%	23%	21%	25%	34%	79%
North of NC	March		44%						
	May-Jun		56%		14%				
	Jul-Aug	100%		17%	31%	100%	92%	100%	
	Sep-Oct			83%	55%				
North of NC Sum		893	1825	16131	6379	3290	19743	4437	
	% of G Total								
South Carolina and Georgia	Jan-Feb								
	March	6%							100%
	April								
	May-Jun	10%	32%	19%	71%	18%	33%	33%	
	Jul-Aug	27%	12%	36%	7%	20%	36%	30%	
	Sep-Oct	18%	33%	36%	16%	13%	21%	11%	
	Nov-Dec	38%	20%	6%	5%	44%	9%	22%	
South Carolina and Georgia Sum		66940	63410	83550	118208	28073	61180	26428	415
•	% of G Total	14%	17%	16%	26%	8%	11%	8%	20%
Grand Total		464347	364967	529465	449264	359696	550105	339989	2044

Table 16. Number of fish size sample for king mackerel by sector.

NumFish	Atlantic		Atlantic Tota	Gulf		Gulf Total
Year	Commercl	Recreatn		Commercl	Recreatn	
1981	980.00	2,141.00	3,121.00	15,563.00	916.00	16,479.00
1982		578.00	578.00	7,994.00	947.00	8,941.00
1983	858.00	902.00	1,760.00	15,160.00	1,355.00	16,515.00
1984	4,447.00	1,372.00	5,819.00	31,871.00	2,320.00	34,191.00
1985	5,059.00	2,918.00	7,977.00	17,691.00	3,845.00	21,536.00
1986	4,548.00	3,663.00	8,211.00	6,536.00	3,644.00	10,180.00
1987	6,785.00	6,168.00	12,953.00	4,210.00	5,601.00	9,811.00
1988	6,434.00	2,500.00	8,934.00	1,577.00	3,035.00	4,612.00
1989	5,917.00	2,131.00	8,048.00	3,069.00	2,944.00	6,013.00
1990	6,378.00	2,055.00	8,433.00	2,951.00	2,445.00	5,396.00
1991	8,334.00	1,959.00	10,293.00	4,807.00	4,331.00	9,138.00
1992	6,755.00	2,631.00	9,386.00	8,873.00	4,181.00	13,054.00
1993	4,401.00	1,511.00	5,912.00	7,520.00	2,574.00	10,094.00
1994	6,632.00	1,415.00	8,047.00	3,455.00	2,989.00	6,444.00
1995	2,405.00	1,583.00	3,988.00	4,623.00	2,432.00	7,055.00
1996	4,374.00	954.00	5,328.00	7,355.00	2,726.00	10,081.00
1997	1,746.00	2,662.00	4,408.00	4,636.00	3,863.00	8,499.00
1998	5,182.00	1,930.00	7,112.00	4,570.00	3,846.00	8,416.00
1999	6,891.00	1,463.00	8,354.00	7,310.00	3,842.00	11,152.00
2000	7,800.00	2,136.00	9,936.00	6,491.00	4,028.00	10,519.00
2001	6,313.00	1,776.00	8,089.00	4,321.00	3,329.00	7,650.00
2002	3,180.00	853.00	4,033.00	4,243.00	1,446.00	5,689.00
Grand Total	105,419.00	45,301.00	150,720.00	174,826.00	66,639.00	241,465.00

Table 17. Number of fish size sample for king mackerel recreational fisheries by mode.

Stock	Year	Other Rec	Headboat	Total	Stock	Year	Other Rec	Headboat	Total
Atlantic	1981	2,141		2,141	Gulf	1981	916		916
	1982	578		578		1982	947		947
	1983	902		902		1983	1,355		1,355
	1984	276	1,096	1,372		1984	1,856	464	2,320
	1985	1,382	1,536	2,918		1985	3,451	394	3,845
	1986	1,893	1,770	3,663		1986	2,964	680	3,644
	1987	5,179	989	6,168		1987	3,951	1,650	5,601
	1988	1,929	571	2,500		1988	2,488	547	3,035
	1989	1,606	525	2,131		1989	1,623	1,321	2,944
	1990	1,761	294	2,055		1990	1,714	731	2,445
	1991	1,575	384	1,959		1991	3,518	813	4,331
	1992	2,246	385	2,631		1992	3,213	968	4,181
	1993	1,119	392	1,511		1993	1,793	781	2,574
	1994	1,053	362	1,415		1994	2,060	929	2,989
	1995	1,249	334	1,583		1995	1,475	957	2,432
	1996	882	72	954		1996	1,966	760	2,726
	1997	2,164	498	2,662		1997	2,647	1,216	3,863
	1998	1,418	512	1,930		1998	3,052	794	3,846
	1999	1,155	308	1,463		1999	3,297	545	3,842
	2000	1,739	397	2,136		2000	3,642	386	4,028
	2001	1,482	294	1,776		2001	2,975	354	3,329
	2002	853		853		2002	1,446		1,446
Atlantic Total		34,582	10,719	45,301	Gulf Total		52,349	14,290	66,639

Table 18. Number of fish size sample for Atlantic king mackerel commercial fisheries by gear.

		Atlantic								-	Atlantic Total
Year		Drift GN	GILLNT	H&L	PURSE	TRAMML	TRAWL	Unclass	UNK		
	1981		69	911							980
	1982										
	1983			858							858
	1984		114	4,333							4,447
	1985	1	32	5,007			2	17			5,059
	1986		209	4,243			96				4,548
	1987		3,597	3,154			34				6,785
	1988	263	1,643	4,524			4				6,434
	1989	2,047	87	3,499	253		30	1			5,917
	1990			6,368			8	1		1	6,378
	1991	16	6	8,311				1			8,334
	1992	5		6,750							6,755
	1993		81	4,235		4	5	4		72	4,401
	1994	39	63	6,476			54				6,632
	1995	26		2,378				1			2,405
	1996	85	184	4,102				3			4,374
	1997		3	1,743							1,746
	1998		7	5,175							5,182
	1999	2	11	6,878							6,891
	2000			7,800							7,800
	2001			6,313							6,313
	2002			3,180							3,180
Grand	Total	2,484	6,106	96,238	253	4	233	28		73	105,419

Table 19. Number of fish size sample for Gulf king mackerel commercial fisheries by gear

		Gulf							Gulf Total
Year		DRFGNT	GILLNT	H&L	PURSEI	TRAWL	Unclass	UNK	
	1981	116	4,609	10,838					15,563
	1982		4,396	3,598					7,994
	1983		2,979	11,171	1,010				15,160
	1984		3,527	23,793	4,535		16		31,871
	1985		2,091	14,247	1,275	31	9	38	17,691
	1986		3,219	3,043	271		1	2	6,536
	1987		625	3,585					4,210
	1988		564	990			23		1,577
	1989			3,013			56		3,069
	1990		401	2,547			3		2,951
	1991	124		4,683					4,807
	1992	237		8,585	3		48		8,873
	1993	1,374	1	6,144			1		7,520
	1994	29	1	3,385			40		3,455
	1995	983		3,635			5		4,623
	1996	1,606	2	5,697				50	7,355
	1997	537	6	4,086			7		4,636
	1998	1,457		3,107			6		4,570
	1999	1,528	1	5,756			25		7,310
	2000	1,257		5,202			32		6,491
	2001	432		3,887			2		4,321
	2002	572		3,642			29		4,243
Grand	Total	10,252	22,422	134,634	7,094	31	303	90	174,826

Table 20. Fish size samples distribution by month and year for recreational fisheries of Atlantic king.

1 Fish	Non-Headboa	t recreational													
	Year J	an Feb	Ma	ar A	Apr	May	Jun	Ju	1 /	Aug Sej)	Oct	Nov	Dec	
	1981				5.7%		3.1%	19.4%	41.5%	10.9%	11.8%	7.0%			
	1982				23.7%	. 2	26.5%	6.6%	9.7%	14.0%	10.7%	8.0%			
	1983				1.9%	. 2	24.7%	12.5%	6.9%	22.2%	15.7%	15.7%			
	1984				4.0%	. 1	18.1%	18.8%	5.4%	16.3%	2.9%	34.4%			
	1985					2	26.6%	6.8%	14.5%	21.3%	12.8%	15.5%	1.7%		
	1986				10.8%	. 1	17.9%	8.9%	17.2%	9.9%	14.8%	11.0%	9.0%		
	1987				4.8%	. 1	13.6%	12.7%	10.8%	8.5%	18.7%	17.5%	13.3%		
	1988				8.4%	. 2	28.8%	7.3%	13.8%	12.0%	18.0%	11.5%			
	1989				10.3%	. 1	19.9%	17.1%	12.6%	5.9%	5.0%	20.7%	8.6%		
	1990			1.5%	5.2%		3.8%	5.7%	16.0%	18.9%	21.6%	15.8%	11.5%		
	1991				1.1%	. 1	10.0%	11.6%	11.9%	15.4%	12.4%	28.3%	8.5%		
	1992		1.2%	2.6%	3.6%		7.4%	10.8%	26.1%	10.3%	4.3%	24.8%	7.4%		
	1993				3.1%		8.8%	12.2%	11.9%	5.6%	5.4%	26.1%	26.5%		
	1994				8.1%		4.3%	11.4%	15.0%	4.0%	7.5%	36.0%	13.7%		
	1995				3.0%		7.0%	7.2%	14.7%	3.1%	4.8%	26.6%	32.8%		
	1996			3.9%	7.3%	. 1	10.8%	7.8%	5.9%	5.6%	16.3%	28.3%	13.5%		
	1997		12.4%	23.5%	3.5%		8.5%	4.8%	6.2%	6.7%	9.6%	20.5%	4.1%		
	1998			12.1%	21.8%	. 1	13.3%	4.2%	7.5%	6.2%	5.4%	14.0%	14.0%		
	1999			5.3%	20.7%	. 1	17.2%	7.2%	9.5%	11.9%	4.8%	11.3%	9.7%		2.4
	2000				11.8%	. 1	10.3%	9.7%	11.6%	10.9%	8.8%	24.1%	12.0%		
	2001			5.2%	6.1%	. 1	17.3%	12.3%	11.7%	15.5%	8.6%	15.9%	6.6%		
	2002				24.0%	. 1	13.4%	26.6%	19.9%	13.1%		1.2%			
	Avg	0.1%	0.7%	2.6%	8.6%	. 1	14.1%	11.0%	13.7%	11.3%	10.0%	18.8%	8.8%		0.3
	Stdev	0.003	0.026	0.055	0.074		0.077	0.055	0.079	0.054	0.057	0.090	0.085		0.0
	Headboat														_
	1984				6.7%	. 1	18.5%	12.4%	15.3%	26.7%	7.4%	12.7%			
	1985				4.2%	. 1	16.6%	9.2%	17.5%	21.7%	9.4%	21.0%			
	1986				13.8%		30.6%	4.8%	12.1%	17.0%	9.3%	11.5%			
	1987	1.4%			25.4%	. 1	18.7%	6.1%	9.5%	9.8%	8.7%	20.1%			
	1988				5.1%		20.5%	7.0%	9.1%	35.4%	9.1%	13.8%			
	1989				5.5%	. 1	10.1%	7.6%	8.2%	18.7%	21.0%	29.0%			
	1990				18.0%		10.5%	6.8%	16.7%	37.8%	6.8%				
	1991				5.5%		6.0%	6.0%	9.4%	11.5%	26.3%				
	1992			1.0%	15.8%		8.6%	12.5%	10.4%	10.9%	11.9%		5.7%		
	1993				5.9%		13.3%	8.9%	7.7%	15.6%	8.4%		5.1%		
	1994				13.0%		19.6%	5.5%	7.7%	10.8%	8.8%				
	1995				18.0%		11.7%	10.2%	12.3%	6.6%	12.3%		1.8%		
	1996			15.3%	8.3%		15.3%	4.2%	9.7%		8.3%		6.9%		5.6
	1997		2.4%	1.8%	1.4%		1.8%	1.8%	4.8%	6.0%	17.7%				5.0
	1998	1.6%		7.070	14.5%		15.4%	7.4%	11.3%	18.9%	12.3%		2.070		
	1999	1.070			21.8%		26.0%	19.2%	11.0%	7.5%	10.4%				
	2000			1.3%	8.1%		15.1%	12.6%	14.1%	10.8%	15.1%		1.0%		
	2001				16.7%		12.6%	8.2%	19.0%	16.0%	17.3%		070		
	2001														_
	Avg	0.2%	0.2%	1.1%	11.5%	. 1	15.0%	8.3%	11.4%	15.6%	12.3%	22.3%	1.6%		0.4

Table 21. Fish size samples distribution by month and year for recreational fisheries of Gulf king.

sNumFish Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	9.7%	9.9%	6.6%	дрі	53.8%	4.9%	2.7%	1.9%	ОСР	001	1.9%	8.09
1982	5.6%	6.2%	13.7%		48.6%	3.5%	2.4%	1.070			15.1%	4.09
1983	4.7%	4.1%	2.4%		10.070	5.7%	15.5%	14.0%	5.4%	8.6%	15.1%	23.8%
1984	/0	4.7%	2.170	1.5%		6.6%	23.4%	21.7%	21.9%	17.0%	1.5%	20.07
1985		,0		1.070	3.2%	9.8%	45.0%	35.9%	1.5%	1.2%	1.3%	1.2%
1986	1.9%	1.4%			1.3%	23.0%	42.9%	19.0%	4.0%	3.9%	1.4%	1.27
1987	2.0%	3.3%	4.9%		8.5%	19.3%	16.4%	27.9%	12.6%	1.8%	1.470	1.8%
1988	2.070	3.370	4.570		6.1%	12.5%	45.5%	22.5%	3.2%	6.9%	1.4%	1.8%
1989	5.1%	8.0%	4.1%		2.2%	4.8%	15.4%	28.8%	18.1%	5.7%	5.3%	2.5%
1990	2.3%	3.9%	4.8%	2.9%	2.7%	12.4%	14.3%	33.0%	10.0%	8.2%	1.9%	3.6%
1991	1.4%	3.370	4.070	2.570	2.9%	8.2%	30.5%	30.6%	14.6%	9.2%	1.570	5.070
1992	1.4%	2.2%	1.2%		3.1%	22.5%	28.0%	24.7%	8.7%	4.3%	2.2%	
1993	4.9%	3.2%	4.2%		3.8%	15.2%	18.1%	15.7%	18.2%	6.1%	4.0%	6.1%
1994	5.9%	2.5%	2.2%	5.0%	7.7%	12.3%	15.8%	24.1%	8.9%	6.6%	5.4%	3.5%
1995	8.3%	8.6%	9.8%	3.0%	3.6%	8.4%	35.4%	8.1%	10.6%	0.0%	1.4%	4.1%
1995	9.6%	6.3%	9.8% 8.2%	1.4%	7.4%	22.5%	20.5%	11.2%	6.4%	1.8%	1.4%	2.9%
	3.3%			1.476		12.4%			11.0%		7.1%	9.5%
1997 1998	14.6%	1.6% 7.2%	4.0%		3.7%	2.2%	16.6% 17.9%	23.8% 17.1%	3.9%	6.5%	8.9%	6.2%
1999	5.9%	10.4%	12.5% 6.5%	5.4%	3.9%	8.0%	15.6%	20.2%	7.1%	5.0% 8.0%	4.5%	5.3%
2000	2.5%	3.2%	3.2%	2.1%	3.1%	15.6%	24.2%	14.8%	6.1%		6.1%	2.0%
2000	3.5%	8.4%		2.170	7.0% 7.0%	12.1%	25.7%		8.4%	13.2% 4.0%	4.4%	6.0%
2002	12.9%	9.1%	6.5%	8.8%	6.6%	14.6%		13.3% 15.0%	0.476	4.0%	2.4%	
	4.8%	4.8%	12.7% 4.9%	1.6%	8.5%	11.6%	16.4% 22.2%	19.2%	0.00/	5.4%	4.3%	1.6% 4.4%
Avg Stdev	0.040	0.033	0.043	0.022	0.140	0.062	0.118	0.093	8.2% 0.061	0.043	0.042	0.050
Headboat	0.040	0.033	0.043	0.022	0.140	0.062	0.116	0.093	0.061	0.043	0.042	0.030
1984	25.4%	21.1%	12.7%		2.4%	1.5%	8.0%	3.9%			13.6%	11.2%
1985	14.2%	8.9%	7.6%		2.476	1.5%	0.0%	3.9%			46.7%	22.6%
1986	8.8%	5.0%	2.2%	2.6%	2.5%	14.1%	11.2%	29.4%	1.5%		17.1%	5.1%
1987	10.7%	6.4%	23.3%	2.0%	1.6%	8.1%	13.9%	16.0%	1.8%	2.4%	6.1%	9.8%
1987	10.7%	0.4%	23.3%		8.8%	9.3%	49.5%	19.7%	1.8%	1.5%	3.7%	6.0%
1989	2.7%	2.3%	2.2%		3.9%	10.6%	49.5% 22.0%	20.7%	21.7%	3.0%	4.2%	6.4%
1989	6.8%	2.3% 8.8%	15.2%	2.5%	3.9% 4.4%	11.1%	22.0%	9.8%	12.4%	2.1%	10.7%	13.8%
	0.0%	0.0%	4.1%	2.5%	4.4%			9.8% 41.1%				6.2%
1991	2.70/	4 00/			C E01	4.1%	15.1%		12.5%	6.2%	10.3%	
1992	2.7%	1.8%	3.1%		6.5%	24.6%	32.2%	9.7%	8.3%	2.8%	3.5%	3.9%
1993	4.9%	6.4%	1.8%	4.00/	5.8%	16.1%	20.6%	15.4%	10.4%	3.3%	7.9%	7.4%
1994	2.3%	2.8%	5.8%	1.2%	15.7%	6.9%	22.6%	16.6%	18.7%	3.0%	2.5%	1.9%
1995	1.8%	6.1%	11.1%		2.1%	18.6%	11.9%	30.3%	7.8%	2.0%	4.2%	3.2%
1996	2.9%	7.9%	1.2%		4.5%	13.7%	27.0%	12.4%	18.4%	7.6%	1.7%	1.8%
1997	3.2%	= 00:	44.05		1.4%	5.6%	3.9%	1.2%	3.8%	2.9%	29.7%	46.2%
1998	24.9%	7.8%	14.9%		4.3%	11.0%	8.7%	5.2%	2.5%	1.6%	13.0%	5.9%
1999	10.6%	2.0%	5.0%	2.8%	6.2%	9.2%	18.7%	18.9%	6.8%	4.0%	9.9%	5.9%
2000	1.8%	2.3%	10.9%	1.3%	5.4%	17.6%	16.3%	13.5%	5.2%	7.0%	7.8%	10.9%
2001	10.5%	19.2%	13.6%	1.1%	4.8%	9.0%	4.8%	4.0%	3.7%	8.8%	9.6%	11.0%
Avg	7.5%	6.1%	7.5%	0.9%	4.5%	10.6%	16.1%	14.9%	7.6%	3.3%	11.2%	10.0%
Stdev	0.077	0.059	0.065	0.009	0.036	0.062	0.121	0.109	0.068	0.026	0.111	0.103

Table 22. Fish size samples distribution by month and year for commercial fisheries (hook & line gear only) of Atlantic king.

Num Fish						<u> </u>			<u> </u>	<u> </u>		
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981				71.4%	19.5%	3.6%	5.5%					
1983					61.3%					29.4%	7.8%	1.5%
1984	1.1%			8.0%	27.9%	4.3%	3.2%	31.3%	9.6%	7.6%	4.0%	2.4%
1985	1.3%		1.2%	7.8%	16.8%	6.5%	15.8%	26.0%	1.1%	8.8%	12.7%	1.5%
1986	6.2%	1.7%		9.5%	13.1%	1.3%	4.7%	23.5%	15.8%	15.9%	7.2%	
1987	1.9%		9.7%	26.3%	8.4%	4.7%	2.8%	3.4%	12.0%	14.6%	9.7%	6.4%
1988	1.4%		2.2%	8.0%	22.4%	9.4%	7.0%	8.9%	13.8%	9.6%	14.3%	3.1%
1989	2.3%	1.7%		18.6%	32.7%	2.5%	2.2%	1.8%	14.0%	11.4%	12.5%	
1990			3.8%	13.6%	16.5%	7.5%	5.0%	20.6%	5.3%	15.6%	10.4%	
1991	1.7%		3.4%	5.6%	13.5%	5.4%	6.0%	20.6%	6.8%	8.7%	4.5%	23.1%
1992			4.0%	11.1%	13.2%	8.9%	9.8%	26.1%	12.0%	9.7%	3.8%	1.0%
1993	1.6%	5.5%	1.4%	14.0%	16.8%	8.2%	9.7%	20.8%	9.9%	6.4%	2.3%	3.4%
1994				6.1%	41.6%	18.7%	6.4%	13.8%	7.6%	3.5%		
1995	1.4%	1.1%		1.7%	43.2%	11.1%	9.7%	15.3%	1.8%	3.0%	2.5%	9.0%
1996			4.3%	9.9%	20.0%	26.9%	2.2%	16.0%	10.1%	1.7%	3.0%	5.1%
1997			11.6%	5.6%	4.1%	23.4%	22.4%	7.7%	4.5%	7.9%	5.0%	6.7%
1998	7.0%	5.1%	6.4%	18.2%	14.5%	4.4%	2.3%	4.2%	14.0%	18.4%	4.9%	
1999	5.5%	1.4%		26.2%	14.7%	11.3%	9.9%	15.9%	6.5%		3.8%	3.9%
2000	6.4%	1.7%	4.6%	14.8%	23.4%	12.2%	7.2%	13.3%	7.5%	3.0%	4.2%	1.7%
2001	6.2%	4.2%		21.0%	19.3%	7.3%	10.9%	21.4%	5.1%	1.3%	2.6%	
2002				18.6%	23.6%	15.1%	13.2%	10.0%	8.6%	5.7%		3.7%
Avg	2.2%	1.3%	2.6%	15.0%	22.2%	9.2%	7.4%	14.3%	7.9%	8.7%	5.5%	3.6%
Stdev	0.024	0.017	0.033	0.148	0.132	0.070	0.053	0.092	0.048	0.071	0.042	0.051

Table 23. Fish size samples distribution by month and year for commercial fisheries (hook & line gear only) of Gulf king.

Num Fish	-			-	·				-	-		·
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	24.6%	24.8%	19.8%	3.9%								26.59
1982	27.2%	25.6%	8.7%	3.3%								35.2%
1983	22.6%	4.0%	13.9%	3.1%				4.7%	14.2%	17.7%	1.5%	18.3%
1984	5.6%	23.3%	13.7%	3.3%		3.4%	7.1%	1.4%	1.5%	3.3%	8.1%	29.0%
1985	6.5%	9.8%	5.0%		4.8%	7.1%	15.3%	8.4%		4.7%	10.0%	27.8%
1986	36.4%	37.1%	3.6%				2.2%	7.3%	4.7%	1.2%		7.3%
1987	36.3%	10.6%					3.7%	31.6%	13.8%	3.3%		
1988	1.8%					35.3%	13.0%	5.6%	3.0%	3.7%	21.5%	15.8%
1989	19.5%	14.2%	7.0%				3.8%	8.5%	15.5%	15.6%	6.3%	9.1%
1990	34.0%										3.0%	62.8%
1991	4.1%						11.4%	9.8%	17.2%	1.3%	6.0%	50.2%
1992	33.2%						8.7%	4.2%	10.1%	15.6%	1.9%	25.6%
1993	20.4%	7.8%	17.1%				6.7%	3.6%	3.9%	1.9%	9.8%	28.6%
1994	17.1%	4.5%	5.1%				17.0%	8.7%	9.0%	3.3%	19.7%	15.4%
1995	14.9%	14.9%	2.8%				11.9%	9.2%	2.4%		18.7%	24.9%
1996	13.7%	22.2%	5.5%				2.7%	3.2%	3.2%	6.4%	3.4%	38.6%
1997	15.9%	13.4%	17.4%				8.5%	2.0%		20.6%	8.1%	13.7%
1998	9.8%	14.0%	12.7%					2.2%	4.0%	4.7%	30.4%	22.0%
1999	21.7%	27.1%	20.1%					3.9%		4.6%	4.5%	16.5%
2000	12.3%	29.9%	33.8%				4.5%	2.9%		4.7%	9.5%	1.6%
2001	24.2%	24.4%	9.7%				1.1%	4.2%	2.6%	8.3%	5.0%	20.5%
2002	28.6%	25.2%	19.1%	0.0%	0.0%	0.0%	1.3%	0.1%	0.0%	3.0%	5.5%	17.2%
Avg	0.196	0.152	0.098	0.007	0.003	0.021	0.055	0.055	0.049	0.056	0.079	0.230
Stdev	0.105	0.111	0.088	0.013	0.010	0.076	0.054	0.066	0.057	0.061	0.080	0.147

Table 24. Fish size sample distribution of king mackerel by migratory group, sector and subarea from 1994 to 2002. (2002 year is incomplete)

Size sample fis	sh		year								
Stock	Sector	Area	1994	1995	1996	1997	1998	1999	2000	2001	2002
Atlantic	Commerci	NC	330	227	346	141	239	714	1170	740	
		GA	32	63	14	15	14	23	18	20	
		sc	169	385	469	552	437	635	862	633	192
		FL Nassau-Flager		3	222	117	1019	146	93	91	184
		FL Volusia-Dade	6006	1701	3139	753	2960	5231	5587	4579	2662
		FL Broward-Dade				32	167	137	65	154	140
		FL Monroe	95	26	184	136	346	5	5	96	2
	Recreatn	NY-MD		1		2		1			1
		VI	6		3	3	6	1	3	5	
		NC	848	983	709	1869	1077	482	894	819	181
		GA	10	14	6	3	7	7	31	9	4
		sc	83	84	83	212	152	81	227	57	18
		FL Nassau-Flager	15	12	4	5	19	14	41	42	58
		FL Volusia-Dade	397	398	87	441	533	577	630	754	519
		FL Broward-Dade	37	70	25	27	81	222	213	30	44
		FL Monroe	19	21	37	100	55	78	97	60	28
	Unclass	NC	416	11		175				1	
		FL Nassau-Flager			136				21		
		FL Volusia-Dade	1		8						
	•	-									
Gulf	Commerci	FL Volusia-Dade	1132	1753	3212	2237	1361	4035	3384	2554	2531
		FL Broward-Dade				86	82	127	76	76	49
		FL Citrus-Escambia	816	558	860	1188	651	577	422	403	94
		FL Collier-Escambia	36	146	108	93	108	334	376	231	276
		FL Sarasota-Escambia	32	3	1	36	31	246	299	181	120
		FL Monroe	272	1543	2844	626	2300	1990	1877	870	1105
		MS						1			
		AL									1
		LA	1167	620	330	370	37		57	6	67
	Recreatn	FL Volusia-Dade	103	164	79	923	532	283	153	385	212
		FL Broward-Dade	29	31	34	29	66	160	59	77	11
		FL Citrus-Escambia	477	149	361	599	610	929	2075	1243	557
		FL Collier-Escambia	12		2	7	5	52	4	9	1
		FL Sarasota-Escambia	86	68	36	154	218	240	160	196	166
		FL Monroe	277	374	533	541	1154	576	266	371	287
		MS	11	12	3	26	22	78	65	30	67
		AL	475	125	37	74	62	186	407	195	135
		LA	60	114	61	163	179	192	93	50	10
		TX	1459	1395	1580	1347	998	1146	746	773	
	Unclass	FL Citrus-Escambia	37	87	215	223					
		FL Collier-Escambia	172	132							
		FL Sarasota-Escambia	563	290	1	53					
		FL Monroe				197	118	109	7		20
		LA	148								
]		TX	66		94	43					

Table 25. Percent distribution of size samples of king mackerel by sector, gear and subarea from 1994 to 2002. (2002 year is incomplete)

ector Commerci King Mackerel % Size-Samples 94-02 (of year total, numb) by Gear and Area for the Atlantic & Gulf stocks

Num Fish Sz		Stock ye	ear																
		Atlantic								G	ulf								
Gear	Area	1994	1995	1996	1997	1998	1999	2000	2001	2002	1994	1995	1996	1997	1998	1999	2000	2001	2002
DRFGNT	FL Volusia-Dade	0.59%																	
	FL Monroe		1.08%	1.94%							0.81%	21.22%	21.13%	11.58%	31.88%	19.52%	19.37%	8.35%	10.65%
	FL Collier-Escambia												0.71%			1.38%		1.64%	2.80%
	AL																		
	LA																		
GILLNT	FL Volusia-Dade	0.95%		4.21%															
	FL Monroe																		
	FL Citrus-Escambia																		
H&L	NC	4.16%	9.44%	7.91%	8.08%	4.61%	10.36%	15.00%	11.72%										
	sc	2.55%	15.97%	10.72%	31.62%	8.43%	9.21%	11.05%	10.03%	6.04%									
	GA		2.62%		0.86%														
	FL Nassau-Flager			5.08%	6.70%	19.66%	2.12%	1.19%	1.44%	5.79%									
	FL Volusia-Dade	89.02%	70.73%	67.49%	42.96%	56.99%	75.72%	71.63%	72.53%	83.71%	32.76%	37.88%	43.66%	48.12%	29.78%	55.18%	51.98%	59.11%	59.65%
	FL Broward-Dade				1.83%	3.22%	1.99%	0.83%	2.44%	4.40%				1.86%	1.79%	1.74%	1.17%	1.76%	1.15%
	FL Monroe	1.43%		2.26%	7.79%	6.68%			1.52%		7.06%	12.16%	17.53%	1.92%	18.45%	7.70%	9.55%	11.78%	15.39%
	FL Collier-Escambia										1.04%	3.14%	0.76%	2.01%	2.36%	3.17%	5.79%	3.70%	3.70%
	FL Citrus-Escambia										23.59%	12.07%	11.69%	25.60%	14.14%	7.89%	6.49%	9.33%	2.22%
	FL Sarasota-Escambia													0.65%	0.66%	3.04%	4.28%	4.14%	2.14%
	MS																		
	LA										33.02%	13.35%	3.81%	7.98%	0.81%		0.88%		1.58%
TRAWL	NC	0.81%																	
Unclass	SC																		
	FL Volusia-Dade																		
	FL Collier-Escambia																		
	FL Citrus-Escambia																		
	FL Sarasota-Escambia																		0.68%
	LA										0.72%								
UNK	LA												0.68%						
Grand Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Total numb size-sample fish	6632	2405	4374	1746	5182	6891	7800	6313	3180	3455	4623	7355	4636	4570	7310	6491	4321	4243
	items show are >0.5% of year-total		2400	1011	1140	3102	3001	.000	3010	3100	3400	1020	7000	1000	4070	7010	3431	1021	72-10

Sector Recreatn King Mackerel % Size-Samples 94-02 (of year total, numb) by Gear and Area for the Atlantic & Gulf stocks

Sum of sNumF	ish	Stock y	ear																
		Atlantic								(Gulf								
Gear	Area	1994	1995	1996	1997	1998	1999	2000	2001	2002	1994	1995	1996	1997	1998	1999	2000	2001	2002
RECH&L	NY-MD																		
	VI																		
	NC	59.93%	62.10%	74.32%	70.21%	55.80%	32.95%	41.85%	46.11%	21.22%									
	SC	5.87%	5.31%	8.70%	7.96%	7.88%	5.54%	10.63%	3.21%	2.11%									
	GA	0.71%	0.88%	0.63%				1.45%	0.51%										
	FL Nassau-Flager	1.06%	0.76%			0.98%	0.96%	1.92%	2.36%	6.80%									
	FL Volusia-Dade	28.06%	25.14%	9.12%	16.57%	27.62%	39.44%	29.49%	42.45%	60.84%	3.45%	6.74%	2.90%	23.89%	13.83%	7.37%	3.80%	11.57%	14.66%
	FL Broward-Dade	2.61%	4.42%	2.62%	1.01%	4.20%	15.17%	9.97%	1.69%	5.16%	0.97%	1.27%	1.25%	0.75%	1.72%	4.16%	1.46%	2.31%	0.76%
	FL Monroe	1.34%	1.33%	3.88%	3.76%	2.85%	5.33%	4.54%	3.38%	3.28%	9.27%	15.38%	19.55%	14.00%	30.01%	14.99%	6.60%	11.14%	19.85%
	FL Collier-Escambia															1.35%			
	FL Citrus-Escambia										15.96%	6.13%	13.24%	15.51%	15.86%	24.18%	51.51%	37.34%	38.52%
	FL Sarasota-Escambia										2.88%	2.80%	1.32%	3.99%	5.67%	6.25%	3.97%	5.89%	11.48%
	MS													0.67%	0.57%	2.03%	1.61%	0.90%	4.63%
	AL										15.89%	5.14%	1.36%	1.92%	1.61%	4.84%	10.10%	5.86%	9.34%
	LA										2.01%	4.69%	2.24%	4.22%	4.65%	5.00%	2.31%	1.50%	0.69%
	TX	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	48.81%	57.36%	57.96%	34.87%	25.95%	29.83%	18.52%	23.22%	0.00%
Grand Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	Total numb cize-cample fich	1/15	1593	954	2662	1030	1/163	2136	1776	853	2080	2/132	2726	3863	3846	3842	40.28	3330	1//6

Table 26. Percent of the catch for Atlantic king with direct size-frequency samples match by sector and year. 100 samples refer to a minimum number of fish measured.

Atlantic	Commercial		То	tal Commercial	Recreational		Total R	ecreational
YEAR	Catch + Sample	e-size	Catch w/o Siz	e	Catch + Sample-siz	e Cat	ch w/o Size	
	> 100 samples	< 100 sampl	es		> 100 samples <	100 samples		
198	1 24.2%	24.30%	51.51%	2,399,459	30.8%	68.45%	0.74%	3,813,916
198	2 0.0%	0.00%	100.00%	3,938,370	49.7%	50.29%	0.00%	5,853,949
198	3 33.3%	12.30%	54.45%	2,386,021	48.4%	51.64%	0.00%	6,231,916
198	4 69.3%	17.76%	12.96%	1,968,572	0.0%	99.90%	0.10%	6,152,396
198	5 87.1%	7.54%	5.39%	2,456,228	49.9%	50.09%	0.00%	7,034,836
198	6 76.3%	12.22%	11.43%	2,801,995	74.0%	25.78%	0.20%	5,895,233
198	7 57.0%	17.20%	25.83%	3,392,485	75.6%	24.37%	0.00%	4,036,602
198	8 64.4%	4.75%	30.88%	3,166,062	68.7%	31.22%	0.05%	4,786,299
198	9 74.8%	19.97%	5.23%	2,480,843	46.9%	52.80%	0.26%	3,336,627
199	0 88.1%	6.20%	5.66%	2,537,741	27.9%	71.66%	0.43%	3,905,392
199	1 83.9%	14.99%	1.09%	2,567,902	46.2%	53.60%	0.22%	5,338,859
199	2 71.5%	26.26%	2.27%	2,244,302	52.4%	47.41%	0.17%	6,670,337
199	3 67.3%	29.76%	2.95%	2,141,263	22.1%	77.80%	0.07%	4,284,508
199	4 45.9%	49.23%	4.89%	2,069,574	21.8%	78.22%	0.00%	3,882,720
199	5 31.3%	62.07%	6.66%	2,011,811	22.8%	77.16%	0.09%	4,142,416
199	54.8%	33.80%	11.41%	2,228,032	8.5%	85.48%	6.06%	3,740,689
199	7 44.9%	36.70%	18.37%	3,045,909	33.9%	63.86%	2.28%	5,281,571
199	3 70.4%	14.20%	15.41%	2,470,723	24.1%	75.45%	0.41%	4,473,059
199	9 82.4%	9.23%	8.35%	2,345,625	70.4%	29.09%	0.48%	3,413,082
200	77.7%	15.39%	6.86%	2,220,774	73.8%	25.75%	0.44%	5,297,380
200	1 55.0%	38.67%	6.28%	1,934,857				
200	2 0.1%	0.36%	99.58%	246,620				

Table 27. Percent of the catch for Gulf king with direct size-frequency samples match by sector and year.

Gulf		Commercial		Tota	I Commercial	Recreational		Total F	Recreational
Year		Catch + Sample-	size	Catch w/o Size		Catch + Sample-si	ze	Catch w/o Size	
		> 100 samples <	100 sampl	es		> 100 samples <	100 samples	;	
	1981	92.4%	0.30%	7.31%	6,714,600	25.0%	72.22%	2.79%	5,581,753
	1982	90.4%	0.00%	9.57%	4,566,449	7.2%	18.37%	74.45%	8,403,500
	1983	87.3%	0.34%	12.31%	4,751,722	25.2%	73.23%	1.56%	2,440,391
	1984	93.3%	1.02%	5.70%	3,383,376	46.9%	52.44%	0.65%	3,028,207
	1985	97.1%	2.44%	0.43%	3,072,275	16.9%	78.19%	4.87%	1,910,715
	1986	80.8%	7.81%	11.39%	2,969,771	53.4%	43.11%	3.54%	1,707,993
	1987	56.2%	4.37%	39.41%	1,822,192	84.3%	15.73%	0.01%	3,951,485
	1988	90.2%	5.78%	4.04%	1,390,413	54.4%	43.95%	1.61%	4,685,704
	1989	83.4%	0.48%	16.12%	1,190,061	58.8%	41.10%	0.15%	2,677,376
	1990	63.9%	7.31%	28.83%	2,320,777	49.0%	50.94%	0.06%	3,994,043
	1991	69.6%	15.90%	14.51%	1,654,709	67.2%	30.23%	2.54%	4,773,681
	1992	96.0%	1.84%	2.11%	2,754,142	60.0%	40.01%	0.00%	3,965,159
	1993	57.0%	0.67%	42.37%	3,606,441	54.5%	45.35%	0.12%	7,045,373
	1994	89.7%	4.17%	6.18%	2,149,527	61.2%	38.77%	0.00%	5,536,448
	1995	67.0%	11.91%	21.04%	2,616,933	55.6%	44.38%	0.00%	7,424,592
	1996	72.7%	21.30%	6.03%	2,887,972	55.2%	44.60%	0.20%	6,689,630
	1997	68.1%	8.20%	23.73%	3,212,639	61.6%	37.93%	0.43%	7,798,919
	1998	41.6%	26.96%	31.46%	3,346,639	66.9%	32.84%	0.30%	5,959,000
	1999	43.4%	0.06%	56.49%	3,724,817	79.6%	19.52%	0.86%	4,654,630
	2000	48.4%	32.70%	18.93%	2,923,983	69.4%	29.39%	1.18%	4,509,300
	2001	47.1%	52.92%	0.00%	2,991,040				
	2002	51.7%	48.28%	0.00%	1,962,793				

Table 28. Number of king mackerel otoliths aged by migratory group and year.

Year	ATL	GOM	MEX	Total
1986	531	350		881
1987	500	934		1434
1988	453	693	103	1249
1989	836	877	174	1887
1990	967	697	244	1908
1991	810	1609	166	2585
1992	1282	1421	114	2817
1993	905	1302	99	2306
1994	895	1006	100	2001
1995	658	1026		1684
1996	969	1759		2728
1997	531	1210		1741
1998	821	646		1467
1999	889	588		1477
2000	713	892		1605
2001	823	1714		2537
2002	31	1111		1142
rand Total	12,614	17,835	1,000	31,449

Table 29. Sex distribution of king otolith samples for ALK input

	ATL			Eastern G	ulf		Western G	ulf		Grand Tota
Year	Fem	Male	Unk	Fem	Male	Unk	Fem	Male	Unk	
1986	20:	3 182	146	155	53	26	50	49	17	881
1987	29	3 205	5 2	427	164	7	203	131	2	1434
1988	250	196	5 7	268	97	2	220	99	7	1146
1989	49	7 339)	319	171	31	245	110	1	1713
1990	57	350	41	298	158	5	148	88		1664
1991	52	7 279) 4	849	374	8	252	125		2418
1992	79	9 478	5	733	319	6	221	140	2	2703
1993	55	1 353	3 1	774	379	9	72	68		2207
1994	48	3 408	3 4	657	263	6	49	31		1901
1995	35	3 295	10	728	298					1684
1996	70	1 267	1	1371	380	8				2728
1997	28	3 225	23	856	354					1741
1998	54	5 270	5	422	221	1				1464
1999	503	3 372	14	391	196					1476
2000	470	3 234	3	719	172				1	1605
2001	550	271	2	941	772					2536
2002	1	5 12	2 4	627	484					1142
rand Total	760	5 4736	272	10535	4855	109	1460	841	30	30443

Table 30. Monthly distribution of otolith samples king mackerel sexed fish Atlantic group.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986				20	27	85	126	97	20	10		
1987				31	63	119	90	46	18	21	110	
1988				37	145	118	63	33	44	6		
1989					64	84	164	97	218	196	13	
1990	1		18	12	74	135	140	208	179	115	38	6
1991	41	10	9	24	40	55	158	145	142	131	34	17
1992	17	13	1	23	65	173	252	177	304	169	40	43
1993	19	65	40	79	136	215	97	51	97	60	8	37
1994	28	39	19	47	187	35	103	88	241	60	13	31
1995			27	11	255	83	134		85	39		14
1996	8	11		139	98	229	173	162	38	110		
1997					29	85	103	51	139	78		23
1998	17	15	30	62	158	71	143	35	149	110	25	
1999	19	13		160	164	92	53	147	102	43	82	
2000			26	1	49	96	208	80	128	87	35	
2001				36	73	179	157	76	154	93	31	22
2002			25		2							

Table 31. Monthly distribution of otolith samples king mackerel sexed fish Gulf migratory group.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1986						17	177	81	27	1	4	
1987	4	6	37	5	81	180	290	172	118	1	19	12
1988					12	142	405	68	33	12	3	9
1989	9	23	1	2	51	127	281	170	99	47	15	20
1990	42		9	2	63	176	189	105	37	25	5	39
1991	37	18		17	101	303	576	190	97	7	63	191
1992	31	68	19	42	70	267	548	140	86	66	28	48
1993	32	10	28	125	11	126	461	137	173	37	110	43
1994	7	11	10	174	44	67	174	121	187	72	114	19
1995	34	6	1	129	56	61	136	65	106	24	183	225
1996	37	165	93	66	91	162	65	83	325	147	86	431
1997	259	122	260	54	40	72	30	47	203	85	20	18
1998	92	137	64	1	13	28	42	37	3	18	79	129
1999	112	56	27	11	3	80	68	68	10	46	50	56
2000	133	211	186		29	27	52	8	47	19	144	35
2001	412	431	261	5	2	2	70	113	79	160	51	127
2002	667	76	235	9	11	113						

Table 32. Gulf sexed king mackerel otolith samples by main areas.

Year	TX	AL	LA	MS	FL_NW	FL_SW	FL_E
1986	99	69	42	39	58		
1987	334	233	75	55	150		78
1988	319	83	68	84	118		12
1989	355		58	11	353		68
1990	236	18	41	95	207		95
1991	377	4	302	59	550	52	256
1992	361	9	304	47	437	89	166
1993	140	8	569		232	251	93
1994	80		303		317	253	47
1995			187		485	133	221
1996					907	131	713
1997					481	62	667
1998				20	111	94	418
1999		5		66	183	95	238
2000				18	180	53	640
2001		36	214	9	198	57	1199
2002				1	127	30	953

Table 33. Atlantic sexed king mackerel otolith samples by main areas

Year	VA	NC	SC	GA	FL_NE	FL_SE	FL_SW
1986		121	86	29	100	49	
1987		235	123	14	124	2	
1988		91	167	60	55	73	
1989	17	568	109	139		3	
1990		728	93	98	4	3	
1991		656	109	15	1	25	
1992		830	140	81	222	4	
1993		603	80		215	6	
1994		527			333	15	16
1995		306			342		
1996		376	29	49	453	8	53
1997		338		23	147		
1998		453			349	3	10
1999		485			214	176	
2000		523	59		127	1	
2001		504	24		261	32	
2002		25				2	

Table 34. Number of aged fish within 5 cm bin-size for the eastern Gulf king mackerel [females] as input to the ALKs. Rows: age and year Columns size-bin, values number of fish sampled. Dark shade cells with 10 or more fish, light shade cells with 5 to 9 fish sampled.

Count of ForkLength		Size5Uppb	Count of ForkLength	Size5	SUppb
Age 0	Year 1987 1988		9 19 19	987	40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	1989 1991 1993	3 <mark>6</mark> 1 1 1 1	19 19 19	989 990	2 1 2 2 3 3 1 1 1 1 1 2 2 1
	1995 1998 1999		19 19 19	992	1 3 5 12 13 6 17 11 8 5 1 1 1 1 1 5 1 2 3 4 1
1	1986 1987 1988	7 23 15 9 3 3 6 13 21 12 5 6 3	19 19 19	995	1 1 2 4 9 13 8 11 3 1 2 1 4 3 5 1 1
	1989 1990 1991	2 16 7 7 1 3	19 19 19	998	1 2 6 3 1 1 3 6 1 5 2 1 1 3 4 2
	1992 1993 1994	2 10 32 26 15 4 1 1 2 8 23 14 8 6 1	20 20 20 20	000 001	1 3 4 2 1 1 1 2 4 1 2 1 1 2 1 1
	1995 1996	1 5 10 17 15 12 4	10 19 19	986 987	1 2 2 1
	1997 1998 1999	2 8 20 18 29 21 1	19 19 19	989 990	2 1 2 2 2 3 1 1 1 1 1 1
	2000 2001 2002	1 1 <mark>2 15 20 10</mark> 1 2 2 4	19 19 19	992 993	1 1 2 3 3 1 2 2 2 3 7 4 11 11 1 1 2 1
2	1986 1987 1988	1 6 42 58 15 9 5 2 1 1 7 17 22 16 3 4	19 19 19	995 996	1
	1989 1990 1991	10 13 28 15 13 3 2 1 4 6 42 75 59 33 19 5 1	19 19 20	999	1 3 1 4 5 1 2 1 2 2 1 2 1 2
	1992 1993 1994	2 8 27 53 45 43 22 3 4 32 41 37 23 5 3 8 31 36 19 7 2 1	20 20 11 19	002	1 1 2
	1995 1996 1997	4 13 41 27 15 18 10 2 2 1 26 60 64 62 178 93 30 1	19 19 19	987 988	1 1 2 1 2 1 1 1 3 1 2
	1998 1999 2000	7 10 18 17 5 6 3 18 19 10 1	19 19 19	990 991	1 1 1 1 2 1 1 1 1 1 1 1 2 3
3	2001 2002 1986	1 23 26 73 39 20 5 5 30 61 81 50 12 1	19 19 19	993 994	1 5 7 12 9 12 7 2 1 1 1 1 2
	1987 1988 1989	1 1 3 5 5 1 1 2 6 11 10 1 2	19 19 19	996 998	1 3 2 5 7 5 2 1 1 1 3 1 1
	1990 1991 1992	2 4 10 3 5 4 3 1 1 8 18 18 22 21 23 8 1 1	20 20 20 20	000 001	3 1 3 2
	1993 1994 1995	1 24 29 45 21 12 1 1 1 7 17 32 19 9 3 5	12 19 19 19	986 987	1 1 1 1 1 3 1 2 2 2 1
	1996 1997 1998	1 12 24 43 77 57 35 3 1 11 43 97 79 13 2 1	19 19	989 990	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	1999 2000	6 11 10 7 2 3 1 1 5 1 9 15 60 49 16 3 1	19 19 19	992 993	2 1 1 1 3 1 4 2 1
4	2001 2002 1986 1987	4 44 65 37 8 1 1 1 3 6 7 4 2 2	19 19 19	995 996	1 2 1 2 8 4 3 1 1 1 1 1 2 1 1 1 1
	1988 1989	1 3 3 7 2 1 2 5 10 8 4 1 1	19 19 19	998 999	1 1 2 2 1 2 1 1 2
	1990 1991 1992	1 9 12 10 11 3 6 8 4 1 1 1 7 11 15 22 14 10 2	20 20 20	001 002	1 1 3 1 2 1 1 1
	1993 1994 1995	2 6 18 32 22 16 3 2 4 1 6 11 22 25 13 18 7 2 1	13 19 19 19	987 988	1
	1996 1997 1998	2 12 23 28 25 20 6 3 1 1 5 8 14 5 9 3 1 1	19 19 19	990 991	1 1 1 1 1 1 4 1 1
	1999 2000 2001	1 1 5 73 53 21 9 6 1 1 10 20 40 26 14 11 6 1 2	19 19 19	993 994	1 1 2 1 2 2 1 1 1 1 1 2 2
5	2002 1986 1987	2 1 2 3 1 2 4 <mark>8 7 10 5</mark> 1	19 19 19	998 999	1 4 1 6 3 1 2 1 1 1 1 1
	1988 1989 1990	1 1 2 5 4 3 1 3 1 1 1 4 3 5 7 5 1	20 20 14 19	986	1 2 1 3 2
	1991 1992 1993	1 1 10 14 20 13 8 3 1	19 19 19	988 989	2 2 2 3 2 3 3 1 1 1
	1994 1995 1996	2 13 19 19 11 13 6 5 5 12 23 23 8 5 1	19 19 19	991 992	1 1 1 1 1 2 1 1
	1997 1998 1999	5 7 13 6 4 2 3 3	19 19 19	994 995	1 1 2 1 1 1 1 1 1 1 1 1 1 1
	2000 2001 2002	21 22 23 18 7 5 1 6 8 9 15 20 12 5 2 2 1 6 14 8 9 4 6 1 1	19 19 19	998 999	1 2 3 1 1
6	1986 1987 1988	1 1 1 4 2 1 2 1	20 15 19 19	987 988	1 1 1 1 3 2 2 1 1 1 1 1
	1989 1990 1991	2 1 1 1 1 6 2 4 1 2 1 3 9 7 13 17 14 10 8 4 1	19 19	992	1 1 1 1 1 1
	1992 1993 1994	1 2 6 13 10 5 5 3 2 1 2 1 3 5 4 5 4 1	19 19 19	993 994	1 3 1 1 1 2 1 1
	1995 1996 1997	1 1 15 21 13 14 4 6 2 4 1 9 15 10 11 11 8 2 1	19 20 16 19	997 000	1 3
	1998 1999 2000	1 0 5 10 11 11 8 2 1 1 1 1 8 2 1 1 1 1 8 8 4 2 1 1 1 1 8 8 4 2 1 1 1 1 1 8 1 2 1 1 1 1 1 1 1 1 1 1 1	19 19 19	987 988	1 1 2
7	2001 2002 1986	3 b b 15 5 8 4 2	19 19 19	990 994	2 1 1 1 1 1 1
	1987 1988 1989	1 1 3 1 7 2 1	19 17 19 19	998 987 988	1 1 1 1 1
	1990 1991 1992	1 1 2 4 4 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1	19 19 19	989 990 991	3 1 1
	1993 1994 1995	4 6 11 7 8 8 4 2 1 1 1 3 2 3 1 4 10 4 12 14 8 2 1	19 19 19	993 994 995	1 1 1
	1996 1997 1998	3 2 8 4 1	18 19 19 19	986 987 988	2 1 1 2 1 1 1 1 1
	1999 2000 2001	1 6 1 1 2 3 2 3 2 5 1 2 2 3 1 2 1 3 1 1 1 5 11 5 3 5 1 1	19 19 19	989 990 991	2 1 1 1 1 1
8	2002 1986 1987	1 1 2 1	19 19 19 19	992 994 986	1 1 1
	1988 1989 1990	1 3 3 7 2 2 1 1 1 2 2 1 1 1 1 4 8 6 5 3 1 2	19 19 19	988 990 991	1 1 1 1 1 2
	1991 1992 1993	1 1 1 2 1 5 3 3 4 2 1 1 6 10 15 7 2 3	20 19 19 19	988 992 993	1 1
	1994 1995 1996	1 2 3 5 8 2 3 4 1 1 1 2 2 1 5 4 1 3 5 3 12 5 2 1	19 20 21 19	995 001 987	1 1 1
	1997 1998 1999	1 2 7 4 2 2 1 1 1 3 1 3 3 3 2 2 2 1 1 8 5 4	19 19 19	988 989 991	1 1
	2000 2001 2002	1 1 2 3 2 5 2 5 2 1 1 2 2 1 1	19	992	1

Table 35. Age-Length-Keys for Gulf King Females use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

	Size Uppb	1		Size Uppb
Data YEAR Age 0	35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 150 155 160 200	Data Age 10	YEAR 1986	35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 150 155 160 200 0.111 0.100
	1987 1,000 1988 1,000		1987 1988	0.125 0.037 0.069 0.048 0.069 0.080 0.071 0.097 0.167 0.219 0.208
	1999 1.000 1990 1.000		1989 1990	0.100 0.067 0.111 0.188 0.087 0.265 0.034 0.045 0.083 0.048 0.048
	1992 1.000		1991 1992	
	1993 1.000 0.154 0.038 1994 1.000		1993 1994 1995	0.014 0.027 0.036 0.067 0.048 0.071 0.040
			1995 1996	0.013 0.020 0.075 0.143 0.306 0.500 0.421 0.231 0.182 0.021 0.087 0.048
	1996 1997 1.000 1998 1.000 0.083 0.043 0.074 0.077 0.091		1996 1997 1998	0.074 0.133 0.062 0.308 0.227 0.062
	1999 1.000 0.023 0.094 0.053 0.06 2000 1.000 0.023 0.094		1999 2000	0.105 0.083 0.130 0.083 0.133 0.067 0.222 0.188
	2002 1.000		2001	0.038 0.059 0.250 0.091
Age 1	1996 1.000 0.900 0.615 0.683 1997 1.000 0.882 0.533 0.123 0.050 0.053	Age 11	2002 1986 1987	0.167
	1988 0.867 0.640 0.333 0.029 1989 1.000 1.000 0.97 0.75 0.47 0.051 0.017 1990 0.815 0.475 0.184		1988 1989	0.083 0.094 0.083 0.056 0.077 0.136 0.033 0.067 0.211 0.148 0.125 0.217 0.088
	1990 0.815 0.78 0.194 1991 0.81 0.000 0.86 0.73 0.081 0.011 1991 0.81 0.000 0.86 0.73 0.081 0.011 0.011		1990	0.042 0.087 0.048 0.182 0.020 0.014 0.020 0.030 0.067
			1991 1992 1993	0.040 0.122 0.128 0.297 0.231 0.609 0.467
	1994 1,000 0.488 0.199 0.143 1995 0.818 0.867 0.583 0.299 0.273 0.075 1996 1,000 0.907 0.683 0.374 0.089 0.075 0.081		1994 1995	0.036 0.040 0.024 0.036 0.038 0.105
	1996 1.000 1.000 0.007 0.656 0.374 0.080 0.075 0.081 1997 0.431 0.341 0.159 0.053		1996	0.007 0.107 0.071 0.217 0.429 0.500
	1997 0.431 0.341 0.159 0.063 1998 0.7750 0.778 0.531 0.130 0.047 1999 1.000 1.000 1.000 0.890 0.950		1997 1998 1999	0.045 0.062 0.062 0.105 0.083 0.043 0.333
	2000 0.552 0.386 0.353 0.143 0.027 2001 0.500 0.385 0.297 0.037		2000 2001	0.200 0.111 0.054 0.017 0.059 0.095 0.250
Age 2		Age 12	2002	0.067
	1966 0.100 0.231 0.867 0.308 0.067 1976 1977 0.118 0.467 0.482 0.788 0.342 0.340 0.233 0.303 1988 0.133 0.380 0.586 0.743 0.380 0.586 0.541 0.482 0.788 0.482 0.788 0.484 0.48		1986 1987 1988	0.071 0.091 0.100 0.037 0.042 0.037 0.103 0.048 0.100 0.143 0.094 0.042 0.175 0.133
	1989 0.033 0.154 0.400 0.720 0.231 0.119 0.050		1989 1990	0.053 0.074 0.063 0.174 0.029 0.034 0.042 0.286 0.182
			1991 1992	
	1993 0.038 0.118 0.818 0.875 0.444 0.286 0.059 0.032		1993 1994	0.043 0.043 0.083
	1995 0.333 0.486 0.673 0.970 0.757 0.400 0.120 0.026 1996 0.993 0.333 0.496 0.692 0.472 0.570 0.400 0.164		1995 1996	0.028 0.053 0.077 0.182 0.043 0.048 0.083
			1996 1997 1998	0.045 0.048 0.085 0.025 0.186 0.062
	1998 0.250 0.185 0.312 0.435 0.250 0.077 0.152 1999 0.133 0.445 0.250 0.029 0.		1999 2000	0.043 0.083 0.067 0.111 0.062
	2001 0.500 0.564 0.392 0.390 0.181 0.132 0.054 2002 0.538 0.923 0.913 0.573 0.289 0.119 0.024		2001	0.111 0.062 0.115 0.048 0.125 0.375 0.067
Age 3	0.000 0.000	Age 13	2002 1986 1987	0.097 0.300 0.074 0.138 0.143 0.200 0.071 0.176
			1987 1988 1989	0.074 0.138 0.134 0.200 0.071 0.176 0.094 0.042 0.267 0.077 0.105 0.037 0.125 0.043 0.029
	1990 0.087 0.102 0.345 0.348 0.346 0.200 0.111 0.034 1991 0.128 0.277 0.311 0.359 0.294 0.194 0.060 0.014		1989 1990 1991	0.105 0.037 0.725 0.043 0.020 0.048 0.045 0.020 0.130 0.250 0.067 0.143
	1992 0.016 0.137 0.301 0.518 0.432 0.527 0.183 0.075		1991 1992 1993	0.020 0.050 0.050 0.057 0.055 0.067 0.051 0.050 0.057 0.055 0.067 0.051 0.051 0.057 0.051 0.057 0.051 0.057 0.051 0.057
	1990 0.045 0.250 0.378 0.519 0.271 0.143 0.014 0.020 0.004 0.019 0.019 0.019 0.019 0.019 0.020 0.020 0.020 0.020 0.019 0.019 0.058 0.114 0.450 0.250 0.375 0.012 0.049 0.019 0.019 0.024		1993 1994 1995	0.027 0.43 0.067 0.026 0.120 0.100 0.048 0.077 0.053 0.482 0.273
	1995 0.088 0.714 0.490 0.250 0.375 0.788 0.073 0.000 0.079 0.024 1996 0.011 0.104 0.230 0.304 0.228 0.250 0.035 0.030 0.21 1997 0.012 0.097 0.442 0.807 0.582 0.200 0.089 0.025		1995 1996 1997	U.048 U.077 U.053 U.462 0.273
			1997 1998 1999	0.045 0.250 0.042 0.043 0.083
	0.241 0.344 0.286 0.250 0.042 0.143 0.062 0.063 2000 0.114 0.099 0.200 0.086 0.07 0.287 0.027 0.082 2001 0.051 0.284 0.519 0.889 0.70 0.315 0.259 0.052		2000	
Ace 4	2002 0.087 0.343 0.444 0.405 0.171 0.067		2001 2002 1986	0.048 0.250 0.125 0.091
rige 4	1986 0.083 0.154 0.400 0.438 0.615 0.400 0.214 0.056 1987 0.018 0.083 0.132 0.298 0.256 0.500 0.304 0.259 0.121 0.059	Age 14	1987	0.273 0.200 0.074 0.103 0.143 0.150 0.143 0.363 0.032 0.031 0.083 0.056 0.133 0.154
	1988 0.024 0.114 0.208 0.231 0.286 0.440 0.167 0.179 1989 0.0380 0.179 0.036 0.400 0.427 0.175 0.200 1990 0.0200 0.273 0.175 0.440 0.021 0.172 0.045		1988 1989	0.059
	1990 0.020 0.273 0.154 0.400 0.519 0.172 0.045 0.087 1991 0.036 0.128 0.144 0.218 0.314 0.128 0.144 0.116 0.082 1992 0.036 0.116 0.216 0.327 0.330 0.175 0.116 0.043 0.038		1990 1991 1992	0.048 0.045 0.020 0.083 0.067
			1993	0.025
	1983 0.100 0.196 0.190 0.494 0.429 0.175 0.229 0.098 0.022 0.044 0.191 0.239 0.491 0.191 0.239 0.491 0.191 0.239 0.491 0.191 0.239 0.491 0.239 0.491 0.239 0.491 0.239 0.491 0.239 0.239 0.129 0.024 0.053 0.390 0.129 0.024 0.053 0.000 0.107 0.007 0.170 0.209 0.191 0.008 0.007 0.007 0.170 0.200 0.191 0.008 0.007 0.007 0.170 0.191 0		1994 1995	0.036 0.143 0.015 0.038 0.053 0.077 0.091
	1986 0.026 0.080 0.197 0.087 0.170 0.29 0.191 0.105 0.197 0.107 1997 0.035 0.106 0.152 0.282 0.280 0.386 0.448 0.150 0.037 0.041 0.082 0.212 0.380 0.386 0.448 0.150 0.037 0.043 0.082 0.384 0.111 0.087 0.082		1996 1997 1998	0.043 0.095 0.250
			1999	0.045 0.062 0.067
	2000 0.039 0.041 0.110 0.427 0.402 0.214 0.270 0.375 0.111 0.111 0.101 0.027 0.055 0.111 0.278 0.326 0.179 0.155 0.192 0.059 0.048		2000 2001	0.067 0.062
Age 5	2002 0.077 0.218 0.289 0.316 0.687 1986 0.154 0.267 0.250 0.077 0.200 0.296 1987 0.053 0.064 0.047 0.300 0.304 0.222 0.994 1.677 0.048	Age 15	2002 1986 1987	0.056
			1988	0.037 0.048 0.200 0.071 0.176 0.031 0.056 0.133 0.154
	1989 0.051 0.068 0.059 0.279 0.318 0.087 0.277 0.277 0.271 0.088 0.075 0.279 0.218 0.085 0		1989 1990	0.063 0.174 0.088 0.045
	1991 0.109 0.157 0.319 0.440 0.174 0.041 0.139 0.000 1992 0.027 0.088 0.122 0.083 0.250 0.140 0.087 0.115 1990 0.025 0.140 0.286 0.347 0.180 0.122 0.087 0.27		1991 1992 1993	0.043 0.091 0.167
	1993 0.025 0.141 0.286 0.347 0.180 0.122 0.067 0.027 1994 0.045 0.183 0.353 0.341 0.289 0.429 0.103 0.036		1994	0.098 0.130 0.133 0.039 0.080 0.100 0.143 0.013 0.077 0.0011
	1994 0.046 0.183 0.353 0.341 0.289 0.420 0.103 0.006 19965 0.050 0.193 0.242 0.269 0.240 0.193 0.119 0.128 0.250 0.650 0.772 0.447 0.191 0.107 0.096		1995 1996	0.013 0.077 0.091
	1997 0.010 0.028 0.046 0.221 0.138 0.225 0.110 1998 0.016 0.077 0.152 0.292 0.435 0.222 0.133 0.062 0.170 0.227 0.458 0.228 0.312 0.283 0.167	1	1997 1998 1999	0.023
			2000	0.333
	2001 0.028 0.058 0.049 0.228 0.250 0.254 0.154 0.095 0.250 0.250 2020 2002 0.007 0.049 0.155 0.220 0.250 0.250 0.400 0.133		2001 2002	
Age 6	1986 0.54 0.100 0.143 0.111 1987 0.047 0.067 0.174 0.074 0.212 0.125 0.069 0.143 1988 0.019 0.006 0.057 0.280 0.330 0.390 0.355 0.220 0.004 0.125 0.111	Age 16	1986 1987 1988	0.100 0.030 0.042 0.037 0.050 0.071
	1989 0.034 0.050 0.047 0.182 0.100 0.067 0.105 0.074 0.063		1988 1989	0.125 0.056 0.267 0.154 0.033 0.063
	1990 0.037 0.100 0.037 0.237 0.176 0.227 0.088 0.174 1991 0.047 0.098 0.191 0.180 0.232 0.288 0.304 0.121 0.043 0.083		1989 1990 1991	0.042 0.043 0.048 0.136
	1992 0.011 0.088 0.217 0.325 0.349 0.348 0.154 0.091 0.087 1993 0.011 0.042 0.016 0.080 0.080 0.080 0.080 0.080 0.080 0.081 0.043 0.043 0.020 0.088 0.114 0.289 0.286 0.575 0.092 0.086		1992 1993	
	1995 0.025 0.024 0.227 0.256 0.300 0.264 0.095 0.103 0.115 0.158		1994	0.024 0.100 0.091
	1996 0.010 0.040 0.119 0.170 0.277 0.357 0.286 0.043 0.048 1997 0.006 0.018 0.123 0.172 0.125 0.286 0.043 0.048	1	1996 1997	
		1	1998 1999	0.062
			2000 2001	
Age 7	2002 0.024 0.024 0.024 0.222 0.388 0.200 0.09* 1986 0.067 0.063 0.077 0.100 0.214 0.167 0.182	Age 17	2002 1986	
	1967 0.023 0.043 0.074 0.061 0.083 0.259 0.034 0.048 11968 1		1987 1988	0.034 0.048 0.071 0.059 0.042 0.067
	1990 0.050 0.138 0.176 0.091 0.083 0.087 0.095 0.048		1989 1990	0.037 0.235 0.045
	1991 0.016 0.128 0.020 0.159 0.143 0.043 0.091 0.167 1992 0.034 0.100 0.025 0.209 0.174 0.231 0.227 0.091		1991 1992	0.030
	1990 0.012 0.083 0.193 0.200 0.171 0.222 0.188 0.179 0.045 0.025 0.024 0.077 0.115 0.107 0.040 1994 0.045 0.026 0.024 0.077 0.115 0.107 0.040 0.004 0.026 0.026 0.026 0.077 0.083		1993 1994	0.067 0.143
			1995 1996	0.091
	1997 0.046 0.103 0.200 0.091 1998 0.042 0.148 0.133 0.250 0.077 0.227 0.121		1997 1998	
	1999 0.042 0.286 0.062 0.053 0.167 0.130 0.167 0.200 0.020 0.023 0.024 0.025 0		1999 2000	
\Box	2001 0.022 0.089 0.207 0.115 0.176 0.238 0.125 2002 0.073 0.111 0.105 0.133 0.333 0.273	L	2001 2002	
Age 8	996 0.663 0.222 0.182 1997 1997 1997 1997 1997 1997 1997 199	Age 18	1986 1987	0.071 0.100 0.100 0.071 0.059
	1989 0.056 0.036 0.065 0.105 0.111 0.188 0.043 0.021 1999 0.047 0.07 0.13 0.05 0.111 0.188 0.043 0.021 1990 0.037 0.039 0.359 0.354 0.352 0.257 0.174 0.190		1988 1989	0.231 0.130 0.059
	1990 0.037 0.069 0.353 0.364 0.292 0.174 0.190 1991 0.039 0.029 0.041 0.091 0.043 0.083		1990 1991	0.042 0.182 0.043 0.087 0.143
	1991 0.039 0.041 0.072 0.000 0.041 0.001 0.043 0.083 1992 0.044 0.077 0.100 0.033 0.087 0.115 0.273 0.087 1992 0.044 0.070 0.003 0.087 0.115 0.273 0.087 1993 0.044 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.087 0.088 0.088 0.087 0.088 0.08		1992 1993	0.083
	1994 0.029 0.045 0.053 0.119 0.205 0.077 0.143 0.120 0.200 0.141 0.150 0.206 0.077 0.143 0.120 0.200 0.141 0.015 0.026 0.038 0.048 0.103 0.154	1	1994 1995	0.286
			1996 1997	
	907 0.099 0.095 0.099 0.75 0.22 1999 0.75 0.22 1999 0.75 0.22 1999 0.095 0.098 0.75 0.098 0.75 0.098 0.231 0.196 0.72 0.265 0.999 0.098 0.175 0.098 0.098 0.175 0.098 0.098 0.097 0.011 0.200 0.22 1	1	1998 1999	
	2000 0.027 0.111 0.200 0.222 2001 0.030 0.103 0.154 0.118 0.095		2000 2001	
Age 9	2002 0.028 0.067 0.287 0.181 1006 0.000 0.111 0.192	Age 19	2002 1986	0.100 1.000
	1987 0.043 0.111 0.030 0.208 0.148 0.138 0.046 0.214 1988 0.111 0.071 0.097 0.167 0.156 0.125 0.222		1987 1988	0.050 0.059 1.000 0.029 0.042 0.056 0.154 1.000
	9.023 0.033 0.174 0.055 1990 0.038 0.033 0.133 0.074 0.055	1	1989 1990	0.043 0.029 0.048 0.045
		1	1991	0.067 0.429 0.167 0.067
	0.016 0.014 0.100 0.024 0.067 0.081 0.143 1994 0.014 0.023 0.105 0.048 0.282 0.462 0.286 0.400 0.200		1992 1993 1994	
	1995 0.038 0.075 0.071 0.128 0.038 0.077 1996 0.087 0.095		1995 1996	0.053
			1997 1998 1999	
			2000	
1 1	2001 0.038 0.099 0.095 0.250 2002 0.053 0.067 0.133 0.273		2001 2002	0.038

Table 36. Age-Length-Keys for Gulf King Males use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

Data	YEAR	Size Uppb 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 130 155 200	Data	YFAR	Size Uppb 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 130 155 200
Age 0	19	86 1.000 87 1.000	Age 10	1986 1987	0.100 0.182 0.100
	19 19	0.091		1988 1989	0.094 0.100 0.207 0.231 0.143 0.045 0.111 0.048 0.059
	19 19 19	91 1.000 0.108		1990 1991 1992	0.091 0.018 0.026 0.125 0.038 0.067 0.021 0.095 0.212 0.357 0.188
	19 19	93 1.000 0.143		1992 1993 1994	0.021 0.095 0.212 0.357 0.188 0.071 0.050 0.059
	19	95 1.000 0.083 0.086		1995 1996	0.020 0.048 0.286 0.333 0.300 0.066 0.091 0.077
	19	1.000		1997 1998	0.030
	19	1,000		1999 2000	0.059 0.067 0.167
	20	1.000		2001 2002	0.017 0.111 0.200 0.019
Age 1	19 19		Age 11	1986 1987	0.063 0.100 0.045
	19 19	1.000 0.909 1.000 0.933 0.824 0.091 0.029		1988 1989	0.034 0.071 0.037 0.143 0.265
	19 19	90 0.840 0.250 0.053 91 0.892 0.889 0.528 0.136		1990 1991	0.053 0.136 0.107 0.021 0.067
	19 19	0.786 0.471 0.054		1992 1993	0.182 0.071 0.063 0.103 0.393 0.357 0.435
	19 19	95 0.667 0.278 0.261		1994 1995	0.048 0.071
	19 19	97 0.778 0.214 0.125 0.017		1996 1997	0.045 0.231 0.111 0.100
	19 19	1.000 1.000 0.708 0.360		1998 1999	0.030
	20	0.400 0.182 0.195 0.024 0.007		2000 2001 2002	0.022 0.017 0.111 0.133
Age 2	19	0.143 0.444	Age 12	1986 1987	0.100 0.067 0.091 0.100
	19 19 19	0.727 0.769 0.421 0.111		1988 1989	0.067 0.091 0.100 0.077 0.071 0.048 0.059
	19	0.160 0.500 0.826 0.368 0.067		1990	0.136 0.026 0.188 0.231 0.067
	19	92 0.486 0.782 0.740 0.256 0.119		1992	0.021 0.024 0.061 0.063 0.077 0.107 0.107 0.087
	19	0.071 0.429 0.393 0.409 0.015		1994 1995	0.200 0.667
	19	96 0.095 0.583 0.613 0.356 0.225 0.036		1996 1997	0.077 0.056 0.300
	19	98 0.286 0.312 0.500 0.145 0.108 0.034		1998 1999	0.500 0.500 0.118
	20	00 0.333 0.621 0.545 0.613 0.147 0.500 0.795 0.341 0.166 0.073	l	2000 2001	0.167 0.267
Age 3	20 19	02 0.286 0.855 0.824 0.272 0.068 0.222 0.053 0.069	Age 13	2002 1986	0.143
1	19 19	87 0.059 0.190 0.296 0.419 0.192 88 0.154 0.316 0.259 0.063 0.033	1	1987 1988	0.045 0.100 0.077 0.033 0.077
	19 19	0.250 0.174 0.263 0.400	l	1989 1990	0.059 0.071
	19 19	91 0.091 0.235 0.459 0.279 0.036 0.026 92 0.055 0.240 0.654 0.537 0.021 0.024	l	1991 1992	0.026 0.063 0.269 0.200 0.250 0.143 0.125
	19 19	93 0.235 0.571 0.545 0.564 0.036 0.077 0.286 0.205 0.318 0.057	l	1993 1994	0.036 0.107 0.100 0.111
	19 19	95 0.056 0.217 0.400 0.238 0.111 96 0.150 0.274 0.593 0.475 0.143 0.083	l	1995 1996	0.143 0.333 0.300
	19 19	98 0.062 0.273 0.768 0.541 0.379 0.125	l	1997 1998	0.118
	19 20	0.111 0.138 0.136 0.226 0.265 0.111 0.200	l	1999 2000	
ļ	20 20	0.091 0.132 0.515 0.314 0.250 0.074		2001 2002	0.143
Age 4	19 19	87 0.056 0.118 0.071 0.111 0.387 0.231 0.088 0.067 0.077	Age 14	1986 1987	0.100 0.045 0.200 0.154
	19 19	0.167 0.429 0.217 0.136 0.037 0.095		1988 1989	
	19	91 0.029 0.098 0.326 0.036 0.021 0.038		1990 1991 1992	0.036 0.077 0.143 0.188
	19	93 0.036 0.152 0.282 0.321 0.077 0.071 0.036		1993	0.107 0.036 0.130
	19 19 19	0.150 0.381 0.278 0.137 0.190		1995	0.200 0.048 0.111
	19	97 0.119 0.206 0.524 0.267		1996 1997	
	19	99 0.138 0.594 0.412 0.214 0.059		1998 1999 2000	0.118
	20	0.049 0.162 0.291 0.154 0.103 0.185		2001	
Age 5	19	0.056 0.158 0.176 0.231	Age 15	1986 1987	0.100
	19	0.053 0.259 0.250 0.033		1988 1989	0.077 0.214
	19	90 0.053 0.133 0.286 0.211 0.091 0.071 91 0.256 0.464 0.077 0.042		1990 1991	0.038 0.133
	19	92 0.013 0.060 0.188 0.143		1992 1993	0.063
	19	94 0.121 0.400 0.250 0.176		1994 1995	0.059 0.167
	19	96 0.050 0.214 0.111 0.318 0.077		1996 1997	
	19 19	98 0.014 0.108 0.207 0.125 0.125		1998 1999	
	20 20	00 0.032 0.206 0.148 0.333 0.167 01 0.055 0.146 0.154 0.207 0.074		2000 2001	
Age 6	20 19	0.015 0.051 0.085 0.192 0.148 0.214 0.235 0.308 0.250 0.100	Age 16	2002 1986	
	19 19	0.105 0.037 0.250 0.400 0.172 0.154	l	1987 1988	0.077 0.214
	19 19	90 0.053 0.133 0.321 0.158 0.045 0.107	l	1989 1990	0.029
	19 19	91 0.016 0.047 0.214 0.231 0.021 92 0.013 0.045 0.396 0.238 0.152 0.071	l	1991 1992	0.071
	19 19	93 0.015 0.013 0.125 0.103 0.043 94 0.023 0.015 0.143 0.200 0.176	l	1993 1994	
	19 19	95 0.048 0.111 0.314 0.333 0.214 96 0.075 0.375 0.417 0.091 0.154	l	1995 1996	0.111
	19 19	97 0.029 0.048 0.111 0.056 0.050 98 0.034 0.250 0.125	l	1997 1998	0.030
	19 20 20	0.111 0.067	l	1999 2000 2001	
Age 7	20 20 19	0.007 0.034 0.077 0.185 0.308 0.188 0.200	Age 17	2001 2002 1986	
rigu /	19	0.038 0.088 0.300 0.136 0.100 0.077	. 1gc 17	1987	
	19 19	0.029 0.174 0.364 0.444 0.286 0.088	l	1988 1989 1990	0.029
	19	91 0.023 0.125 0.205 0.063 0.038	l	1991 1992	
	19	93 0.013 0.214 0.231 0.036 0.071 0.043	l	1993 1994	0.036
	19	95 0.074 0.176 0.048 0.143 96 0.054 0.167 0.455 0.077	l	1995 1996	0.100
	19	97 0.119 0.289 0.278	l	1997 1998	
	19 20	99 0.029 0.071 0.118 00 0.029 0.185 0.133 0.167	l	1999 2000	
L_	20 20	01 0.007 0.099 0.207 0.185 0.200 02 0.038 0.185 0.286	$oxed{oxed}$	2001 2002	
Age 8	19 19	0.032 0.059 0.200 0.182 0.200 0.231	Age 18	1986 1987	0.033 0.100 0.077
	19 19	89 0.130 0.091 0.037 0.095 0.206	l	1988 1989	
	19 19	0.018 0.103 0.063	l	1990 1991 1992	0.036
	19 19	93 0.018 0.179 0.071 0.130	l	1992 1993 1994	
1	19	95 0.019 0.078 0.095 0.071 0.111	l	1995	
	19	97 0.089 0.111 0.300	ĺ	1996 1997	0.050
	19 19	99 0.029 0.143 0.059	l	1998 1999 2000	
	20 20	0.013 0.143 0.121 0.074	l	2000 2001 2002	
Age 9	20 19 19	0.059 0.077 0.063	Age 19	2002 1986 1987	1.000 1.000
	19 19	0.033 0.241 0.231	l	1988 1989	0.037 0.071 1.000
	19 19	90 0.036 0.158 0.091 0.071	l	1989 1990 1991	0.029 0.067 0.250
	19 19	92 0.095 0.121 0.071	l	1991 1992 1993	0.125
	19 19 19	0.029 0.025 0.176 0.200	l	1993 1994 1995	
	19 19	96 0.028 0.077	l	1996	0.100
	19 19	98 0.062 0.125 0.147	l	1998	0.059
	20	0.167	l	2000 2001	0.009
	20	0.037 0.071		2002	ı l

Table 37. Age-Length-Keys for Atlantic King Females use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

Data	YEAR	Size Uppb 35 40 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 155 200	Data	YEAR	Size Uppb 35 40 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 155 200 0.059 0.143 0.200 0.100
Age 0	1986 1987	1.000 1.000 0.048	Age 10	1986 1987	0.059 0.143 0.200 0.100 0.095 0.176 0.167 0.091 0.095 0.077 0.095 0.083 0.133
	1988 1989	1.000		1988 1989	0.205 0.214 0.281 0.207 0.184 0.080 0.188 0.083
	1990 1991	1.000		1990 1991	0.015 0.075 0.073 0.114 0.079 0.135 0.211 0.154 0.025 0.026 0.032 0.121 0.074 0.069 0.130
	1992 1993	1.000 1.000		1992 1993	0.029 0.018 0.075 0.077 0.114 0.167 0.067 0.071 0.100 0.018 0.050 0.061 0.100 0.107 0.125 0.077 0.067
	1994 1995	1.000 1.000		1994 1995	0.038 0.050 0.115 0.217 0.176 0.030 0.045 0.263 0.130 0.400 0.176 0.267
	1996 1997	1.000		1996 1997	0.010 0.015 0.032 0.167 0.107 0.292 0.125 0.036 0.105 0.059 0.188 0.125
	1998 1999	1.000 0.050 0.023 0.019 1.000		1998 1999	0.070 0.058 0.130 0.109 0.138 0.133 0.049 0.098 0.133 0.280 0.500 0.384 0.375
	2000 2001	1.000 1.000		2000 2001	0.021 0.020 0.067 0.073 0.171 0.262 0.200 0.077 0.111 0.028 0.029 0.156 0.057 0.107 0.050 0.067
Age 1	1986 1987	1,000 0,923 0,333 0,238 0,905 1,000 0,267 0,565 0,050	Age 11	1986 1987	0.071 0.100 0.048 0.059 0.154 0.058
	1988 1989	0.125 0.824 0.429 0.357 0.013		1988 1989	0.167 0.133 0.130 0.133 0.111 0.068 0.036 0.063 0.034 0.026 0.160
	1990	1.000 0.571 0.357 0.029 0.013 0.687 0.353		1990	0.075 0.088 0.171 0.395 0.227 0.132 0.154 0.263 0.091 0.074 0.172 0.087 0.174
	1992 1993	0.750 0.250 0.139 0.021 0.250 0.308 0.020		1992 1993	0.014 0.071 0.019 0.019 0.081 0.087 0.133 0.071 0.029 0.067 0.071 0.083
	1994	0.867 0.353 0.186		1994	0.154 0.075 0.038 0.087 0.071
	1995 1996	0.900 0.800 0.400 0.050 0.023 1.000 0.767 0.205 0.015		1995 1996	0.043 0.176 0.200 0.143 0.056 0.214 0.083 0.188 0.125
	1997 1998	1.000 0.368 0.091 0.300 0.300		1997 1998	0.053
	1999 2000	1.000 1.000 0.706 0.400 0.024 0.024 0.020 0.125		1999 2000	0.024 0.033 0.160 0.042 0.136 0.125 0.044 0.073 0.171 0.238 0.100 0.115 0.111
Age 2	2001 1986	0.300 0.033 0.077 0.867 0.762 0.793 0.286 0.143	Age 12	2001 1986	0.176 0.219 0.143 0.071 0.150 0.100
	1987 1988	0.048 0.733 0.391 0.900 0.250 0.833 0.895 0.375 0.167		1987 1988	0.176 0.077 0.222 0.182 0.048 0.238 0.042 0.067
	1989 1990	0.176 0.571 0.571 0.514 0.100 0.030 0.429 0.619 0.676 0.250 0.013 0.015		1989 1990	0.023 0.036 0.063 0.069 0.211 0.063 0.083 0.025 0.049 0.114 0.054 0.079 0.038 0.053
	1991 1992	0.267 0.647 0.900 0.946 0.391 0.085 0.044 0.250 0.750 0.722 0.412 0.275 0.111 0.014 0.029		1991 1992	0.022 0.079 0.161 0.242 0.333 0.172 0.174 0.130 0.014 0.018 0.038 0.058 0.091 0.100 0.033 0.143 0.100
	1993 1994	0.750 0.385 0.353 0.213 0.042 0.133 0.847 0.721 0.545 0.130 0.022		1993 1994	0.025 0.033 0.143 0.067 0.067 0.025 0.077 0.059 0.071
	1995 1996	0.100 0.200 0.800 0.900 0.302 0.118 0.044 0.233 0.795 0.875 0.800 0.389 0.125		1995	0.025 0.07 0.067 0.429 0.250 0.036 0.125 0.125
	1997	0.539 0.864 0.773 0.276 0.143 0.650 0.650 0.643 0.370 0.093 0.022		1997 1998	0.059 0.444 0.125 0.400 0.023 0.034 0.100 0.067 0.083
	1998 1999 2000	0.294 0.550 0.690 0.333 0.081 0.021 0.875 0.882 0.429 0.103		1998 1999 2000	0.023 0.004 0.100 0.067 0.083 0.040 0.083 0.250 0.024 0.048 0.100 0.077 0.111
Age 3	2001	1.000 0.400 0.393 0.114 0.055 0.172 0.393 0.214 0.167	Age 13	2000 2001 1986	0.024 0.045 0.700 0.077 0.111 0.022 0.088 0.094 0.143 0.286 0.300 0.200 0.071
nya 3	1986 1987 1988	0.043 0.050 0.500 0.488 0.190 0.059 0.048 0.105 0.594 0.811 0.259 0.077	, ye 13	1987	0.077 0.167 0.182 0.238 0.095
1	1989	0.071 0.457 0.588 0.227 0.185 0.045		1988 1989	0.089 0.026 0.040
	1990 1991 1992	0.024 0.235 0.375 0.080 0.044 0.024 0.100 0.036 0.522 0.340 0.044 0.050 0.139 0.546 0.578 0.489 0.222 0.159 0.071		1990 1991	0.049 0.053 0.054 0.026 0.077 0.105 0.087 0.087 0.096 0.132 0.077 0.272 0.187 0.233 0.107 0.100
	1993	0.308 0.589 0.475 0.292 0.164 0.050		1992 1993	0.030 0.033 0.036 0.125 0.231 0.200 0.133
	1994 1995	0.070 0.318 0.239 0.087 0.053 0.050 0.535 0.529 0.133 0.030 0.063		1994 1995	0.025 0.038 0.043 0.235 0.167 0.069 0.143 0.016 0.028 0.036 0.063 0.063
	1996 1997	0.083 0.154 0.306 0.292 0.186 0.059 0.016 0.028 0.053 0.045 0.227 0.655 0.476 0.111 0.080 0.036		1996 1997	0.059 0.063
	1998 1999	0.050 0.333 0.574 0.558 0.311 0.125 0.047 0.262 0.548 0.449 0.213 0.107 0.073 0.033		1998 1999	0.109 0.207 0.100 0.333 0.250 0.033 0.091 0.250 0.250
	2000 2001	0.059 0.286 0.231 0.136 0.146 0.040 0.300 0.492 0.761 0.527 0.236 0.109	L	2000 2001	0.020 0.024 0.029 0.077 0.036
Age 4	1986 1987	0.034 0.286 0.429 0.417 0.286 0.100 0.250 0.292 0.429 0.190 0.091 0.056 0.042 0.222 0.556 0.231	Age 14	1986 1987	0.059 0.154 0.056 0.091 0.143 0.095
	1988 1989	0.029 0.288 0.500 0.167 0.091 0.036		1988 1989	0.048 0.042 0.200
	1990 1991	0.059 0.250 0.427 0.250 0.225 0.049 0.067 0.018 0.065 0.170 0.178 0.050 0.026 0.030 0.034		1990 1991	0.026 0.038 0.111 0.103 0.130 0.087
	1992 1993	0.021 0.098 0.244 0.194 0.159 0.036 0.057 0.059 0.279 0.521 0.400 0.250 0.152 0.059 0.067		1992 1993	0.019 0.077 0.045 0.033 0.033 0.107 0.029 0.067 0.036 0.125 0.385 0.133 0.133
	1994 1995	0.023 0.091 0.304 0.391 0.237 0.115 0.025 0.093 0.275 0.200 0.182 0.091		1994 1995	0.087 0.071 0.200 0.143
	1996 1997	0.042 0.031 0.250 0.296 0.299 0.206 0.048 0.028 0.069 0.238 0.296 0.160 0.107 0.105		1996 1997	0.096 0.083 0.188 0.125 0.333 0.250
	1998 1999	0.024 0.037 0.279 0.444 0.475 0.163 0.173 0.043 0.050 0.024 0.071 0.408 0.468 0.393 0.244 0.073 0.033		1998 1999	0.034 0.167 0.067 0.167 0.125 0.042 0.045 0.125
	2000 2001	0.059 0.250 0.487 0.568 0.292 0.200 0.133 0.098 0.029 0.082 0.075 0.255 0.273 0.186 0.109 0.028 0.031		2000 2001	0.029 0.071 0.100 0.154 0.222 0.057 0.036 0.050
Age 5	1986 1987	0.036 0.143 0.083 0.176 0.143 0.100 0.100 0.167 0.143 0.190 0.069	Age 15	1986 1987	0.100 0.048 0.182 0.190 0.143
	1988 1989	0.013 0.167 0.005 0.0067 0.006		1988 1989	0.042
	1990 1991	0.125 0.413 0.353 0.125 0.073 0.086 0.079 0.022 0.234 0.222 0.250 0.158 0.097		1990 1991	0.029 0.026 0.054 0.079 0.038 0.167 0.032 0.034
	1992 1993	0.020 0.078 0.153 0.130 0.071 0.038 0.058 0.023 0.033 0.083 0.145 0.125 0.091 0.088 0.033 0.036 0.042		1992 1993	0.045 0.100 0.071 0.200 0.033 0.083 0.077 0.200
	1994 1995	0.045 0.239 0.435 0.421 0.391 0.077 0.125 0.059 0.047 0.059 0.422 0.273 0.045 0.063 0.087		1994 1995	0.050 0.115 0.130 0.118 0.143 0.167 0.333 0.067
	1996 1997	0.014 0.139 0.103 0.132 0.113 0.056 0.095 0.185 0.240 0.143 0.105		1996 1997	0.036 0.042 0.125 0.063 0.100
	1998 1999	0.019 0.070 0.200 0.150 0.326 0.135 0.130 0.022 0.034 0.024 0.061 0.149 0.321 0.390 0.244 0.100 0.040 0.042		1998 1999	0.067 0.333 0.250 0.033 0.136
	2000 2001	0.036 0.154 0.227 0.312 0.360 0.289 0.098 0.057 0.024 0.030 0.145 0.400 0.512 0.435 0.444 0.147		2000 2001	0.049 0.071 0.167 0.269 0.222 0.031 0.029 0.107 0.100 0.267
Age 6	1986 1987	0.176 0.071 0.300 0.042 0.143 0.238 0.182 0.059 0.077 0.048	Age 16	1986 1987	0.100 0.059 0.143
	1988 1989	0.077 0.143 0.043 0.076 0.241 0.045 0.107 0.156 0.089 0.079		1988 1989	0.087 0.067 0.111 0.089 0.063 0.080 0.063 0.083
	1990 1991	0.027 0.221 0.275 0.293 0.143 0.053 0.055 0.026 0.128 0.311 0.350 0.211 0.194 0.121 0.034 0.043		1990 1991	0.029
	1992 1993	0.029 0.022 0.222 0.174 0.214 0.132 0.192 0.023 0.033 0.042 0.109 0.225 0.061 0.029 0.036		1992 1993	0.038 0.023
	1994	0.043 0.065 0.184 0.217 0.269 0.100 0.077 0.087 0.071 0.020 0.200 0.333 0.545 0.316 0.304 0.300 0.118		1994 1995	0.043 0.059 0.143
	1995 1996 1997	0.028 0.153 0.206 0.265 0.226 0.083 0.143 0.111 0.160 0.214 0.263 0.118		1996	0.028 0.063 0.028 0.200
	1998 1999	0.022 0.075 0.140 0.115 0.174 0.085 0.089 0.085 0.143 0.122 0.288 0.167 0.080 0.042 0.045		1998 1999	0.067 0.067 0.167 0.125 0.040 0.091 0.125
L	2000 2001	0.026 0.045 0.125 0.200 0.200 0.341 0.200 0.095 0.018 0.091 0.140 0.239 0.222 0.206 0.156 0.171 0.036		2000	0.049 0.031 0.111 0.029 0.033 0.111 0.086 0.038 0.100 0.067
Age 7	1986 1987	0.071 0.167 0.471 0.143 0.200 0.100 0.042 0.095 0.095 0.545 0.118 0.154 0.111 0.091 0.048	Age 17	1986 1987	0.143 0.095
	1988 1989	0.037 0.231 0.190 0.042 0.043 0.067 0.056 0.182 0.214 0.103 0.053 0.040 0.125		1988	0.133 0.087 0.111 0.094 0.080 0.188
	1990 1991	0.013 0.088 0.100 0.073 0.086 0.026 0.027 0.053 0.038 0.043 0.133 0.225 0.289 0.226 0.061 0.074 0.069 0.043		1990	0.026 0.054 0.053 0.053 0.083 0.037 0.130 0.087
1	1992 1993	0.056 0.125 0.232 0.286 0.340 0.231 0.091 0.067 0.033 0.100 0.021 0.036 0.075 0.303 0.353 0.067 0.107		1992 1993	0.045 0.967 0.143 0.133 0.133
	1994 1995	0.026 0.087 0.038 0.150 0.038 0.430 0.118		1993 1994 1995	0.038 0.077 0.059 0.143 0.045 0.059
	1996 1997	0.014 0.056 0.175 0.285 0.371 0.250 0.179 0.167 0.063 0.074 0.240 0.143 0.235 0.063 0.100		1995 1996 1997	0.063 0.063 0.063
	1998 1999	0.100 0.140 0.096 0.087 0.217 0.034 0.021 0.018 0.024 0.122 0.133 0.120		1998	0.133 0.250 0.125
<u></u>	2000 2001	0.023 0.062 0.080 0.133 0.073 0.114 0.024 0.077 0.163 0.043 0.194 0.265 0.156 0.143 0.071 0.100 0.067		2000 2001	0.033 0.031 0.050 0.133
Age 8	1986 1987	0.083 0.118 0.071 0.100 0.100 0.100 0.182 0.118 0.154 0.167 0.182 0.048	Age 18	1986 1987	0.143
1	1988 1989	0.048 0.167 0.043 0.056 0.019 0.114 0.107 0.125 0.138 0.105 0.120		1988 1989	0.042 0.067
1	1990 1991	0.025 0.098 0.057 0.079 0.054 0.105 0.044 0.050 0.158 0.129 0.212 0.037 0.103 0.043 0.043		1990 1991	0.027 0.038 0.053 0.167 0.030 0.037
1	1992 1993	0.058 0.029 0.089 0.075 0.115 0.088 0.067 0.127 0.150 0.273 0.206 0.500 0.250 0.125		1992 1993	0.033 0.033 0.036 0.100 0.077 0.067 0.067
1	1994 1995	0.043		1994 1995	0.143 0.333 0.043 0.059 0.143 0.750
1	1996 1997	0.010 0.059 0.097 0.222 0.179 0.167 0.063 0.063 0.048 0.074 0.120 0.286 0.211 0.353 0.188 0.125		1996 1997	0.063 0.063 0.111
	1998 1999	0.075 0.023 0.154 0.152 0.174 0.103 0.067 0.133 0.018 0.098 0.233 0.120 0.042 0.125		1998 1999	0.042 0.125
L	2000 2001	0.021 0.060 0.067 0.098 0.086 0.048 0.033 0.038 0.043 0.083 0.088 0.086 0.071 0.067	L	2000 2001	0.029 0.033 0.038 0.036 0.050
Age 9	1986 1987	0.083 0.095 0.059 0.154 0.200	Age 19	1986 1987	1,000 1,000
1	1988 1989	0.154 0.381 0.292 0.200		1988 1989	0.031 0.037 0.067 0.067 0.056 1.000 0.034 0.125 0.083
1	1990 1991	0.013 0.015 0.075 0.122 0.171 0.158 0.108 0.105 0.115 0.053		1990 1991	0.026 0.054 0.053 0.154 0.263 0.583 0.261
	1992 1993	0.043 0.089 0.075 0.058 0.091 0.067 0.100 0.071 0.050 0.030 0.206 0.107 0.250 0.077 0.067		1992 1993	0.023 0.133 0.167 0.179 0.300 0.036 0.067 0.467
	1994 1995	0.053 0.130 0.154 0.250 0.346 0.174 0.059 0.143 0.167 0.081 0.091 0.211 0.087 0.059		1994 1995	0.333 0.500 0.067
	1996 1997	0.010 0.081 0.056 0.036 0.167 0.188 0.148 0.036 0.158 0.059		1996 1997	0.188 0.063 0.250 0.200
	1998 1999	0.047 0.250 0.283 0.304 0.138 0.300 0.043 0.098 0.073 0.067 0.120 0.167 0.091 0.125		1998 1999	0.069 0.067 0.250 0.500 0.500
	2000 2001	0.021 0.020 0.067 0.049 0.057 0.095 0.200 0.038 0.125 0.057 0.071	L	2000 2001	0.024 0.038 0.111 0.029 0.036 0.050 0.133
			_		

Table 38. Age-Length-Keys for Atlantic King Males use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

		Size Uppb			Size Uppb
Data Age 0	YEAR 1986	35 40 50 55 60 65 70 75 80 85 90 95 100 105 110 120 155 200	Data Age 10	YEAR 1986	35 40 50 55 60 65 70 75 80 85 90 95 100 105 110 120 155 200 0.091 0.125
	1987 1988	1.000 0.037 1.000		1987 1988	0.038
	1989 1990	1.000 1.000		1989 1990	0.020 0.017 0.212 0.333 0.350 0.125 0.016 0.063 0.121 0.065
	1991 1992	1.000		1991 1992	0.133 0.111 0.182 0.013 0.050 0.130 0.107 0.250
	1993 1994	1.000 1.000		1993 1994	0.111 0.241 0.071 0.100 0.016 0.098 0.323 0.263
	1995 1996	1.000 1.000		1995 1996	0.019 0.122 0.200 0.118 0.182 0.143 0.148 0.150 0.111
	1997 1998	1.000 1.000 0.111 0.032		1997 1998	0.045 0.077 0.037 0.053
	1999 2000	1.000 1.000		1999 2000	0.058 0.250 0.370 0.400 0.100 0.077 0.138 0.300 0.143 0.158
Age 1	2001 1986	1.000 1.000 1.000 0.714 0.308 0.154 0.032	Age 11	2001 1986	0.091 0.115 0.211 0.100 0.083 0.091 0.125
-	1987 1988	0.952 0.519 0.778 0.189 0.533 0.077		1987 1988	0.037 0.038 0.182 0.130
	1989 1990	1.000 0.250 1.000 0.417 0.214 0.030		1989 1990	0.074 0.083 0.083 0.016 0.047 0.188 0.242 0.161 0.136 0.167
	1991 1992	1.000 0.034 0.571 0.417 0.038 0.012		1991 1992	0.133 0.067 0.013 0.100 0.152 0.036 0.083 0.091
	1993 1994	1.000 0.429 0.045 1.000 0.706 0.385 0.034		1993 1994	0.022 0.034 0.071
	1995 1996	1 000 0 400 0 167 0 050		1995 1996	0.073 0.057 0.176 0.091 0.200 0.074 0.259
	1997 1998	0.929 0.462 0.038 0.867 0.136 0.625 0.143		1997	0.037 0.136 0.462 0.118 0.125 0.107 0.136 0.462 0.118 0.125
	1999 2000	1.000 0.917 0.467 0.133 0.017 0.067		1999	0.018 0.019 0.075 0.037 0.200 0.077 0.172 0.133 0.333 0.316
A == 0	2001	0.333 0.067	A 40	2000 2001	0.07 0.172 0.133 0.333 0.316 0.091 0.154 0.263 0.100
Age 2	1986 1987	0.286 0.615 0.846 0.355 0.121 0.048 0.444 0.222 0.432 0.045 0.038	Age 12	1986 1987	0.056 0.185 0.267
	1988 1989	0.467		1988 1989	0.059 0.017 0.019 0.167 0.083 0.083 0.083
	1990 1991	0.583 0.714 0.121 0.082 0.016 0.931 0.513 0.079		1990 1991	0.083 0.030 0.161 0.045 0.167 0.027 0.200 0.333 0.200 0.182
	1992 1993	0.429 0.583 0.604 0.289 0.077 0.571 0.455 0.105		1992 1993	0.013 0.067 0.022 0.143 0.162 0.044 0.143 0.100 0.065 0.065 0.056
	1994 1995	0.235 0.615 0.576 0.087 0.600 0.833 0.550 0.082		1994 1995	0.024 0.118
	1996 1997	0.071 0.231 0.594 0.500 0.367 0.133 0.818 0.917 0.160		1996 1997	0.032 0.037 0.111 0.050 0.040 0.037 0.227 0.154 0.235
	1998 1999	0.375 0.679 0.400 0.059 0.083 0.533 0.667 0.333 0.051	l	1998 1999	0.129 0.053 0.025 0.037
	2000 2001	0.867 0.571 0.417 0.667 0.733 0.243 0.048		2000 2001	0.067 0.095 0.053 0.346 0.263 0.200
Age 3	1986 1987	0.077	Age 13	1986 1987	0.091 0.250 0.074 0.133
	1988 1989	0.286 0.630 0.441 0.038 0.100 0.490 0.310 0.038	l	1988 1989	0.174 0.118 0.033 0.083
	1990 1991	0.071 0.515 0.131 0.031 0.034 0.410 0.158 0.108	l	1990 1991	0.021 0.030 0.032 0.136 0.167 0.067 0.133 0.091
	1992	0.358 0.663 0.538 0.076 0.017 0.499 0.614 0.351 0.038	l	1992	0.050 0.413 0.214 0.167 0.185 0.022 0.034 0.071 0.156
	1993 1994 1995	0.409 0.814 0.351 0.038 0.059 0.271 0.207 0.032 0.024 0.400 0.327 0.037	l	1993 1994 1995	0.022 0.034 0.071 0.150 0.032 0.118 0.086 0.182
	1995 1996 1997	0.308 0.406 0.423 0.533 0.129 0.032		1995 1996 1997	0.086 0.182 0.111 0.136 0.176 0.125
	1997 1998 1999	0.045 0.083 0.480 0.211 0.038 0.179 0.514 0.676 0.119 0.032 0.200 0.622 0.508 0.063 0.019	l	1997 1998 1999	0.136 0.176 0.125 0.123 0.025 0.067 0.200
	2000	0.286 0.250 0.387 0.094 0.038 0.034		2000	0.095 0.105
Age 4	2001 1986	0.200 0.568 0.357 0.068 0.030 0.226 0.364 0.167 0.091	Age 14	2001 1986	0.030 0.038 0.100
	1987 1988	0.054 0.227 0.115 0.222 0.067 0.037 0.324 0.115 0.136		1987 1988	0.133 0.045 0.217 0.118
	1989 1990	0.157 0.379 0.077 0.242 0.393 0.063 0.021		1989 1990	0.019 0.100 0.083 0.083 0.021 0.030 0.032 0.167
	1991 1992	0.051 0.237 0.027 0.040 0.036 0.215 0.101 0.017 0.022		1991 1992	0.040 0.100 0.200 0.167 0.017 0.043 0.036 0.333
	1993 1994	0.091 0.281 0.568 0.173 0.044 0.085 0.467 0.129 0.049		1993 1994	0.103 0.143 0.100 0.053 0.111 0.176
	1995 1996	0.224 0.148 0.024 0.029 0.038 0.067 0.290 0.194 0.074		1995 1996	0.571 0.050 0.111
	1997 1998	0.280 0.316 0.192 0.148 0.077 0.086 0.235 0.357 0.111 0.032		1997 1998	0.091
	1999 2000	0.044 0.390 0.614 0.212 0.025 0.067 0.143 0.167 0.516 0.500 0.269 0.069 0.033		1999 2000	0.067 0.033 0.211
Age 5	2001 1986	0.162	Age 15	2001 1986	0.125
-	1987 1988	0.182 0.423 0.222 0.077 0.059		1987 1988	0.074 0.133 0.333 0.043
	1989 1990	0.190 0.212 0.019 0.081 0.197 0.286 0.083		1989 1990	0.019 0.067 0.208 0.083 0.031 0.021 0.161 0.182
	1991 1992	0.026 0.395 0.216 0.120 0.067 0.154 0.203 0.083		1991 1992	0.033 0.111 0.033 0.065 0.179 0.182
	1993 1994	0.054 0.250 0.044 0.036 0.056 0.056		1993 1994	0.035 0.000 0.179 0.150 0.036 0.150 0.105 0.111 0.353
	1995 1996	0.204 0.185 0.098 0.114 0.033 0.355 0.097 0.074		1995 1996	0.024 0.059 0.091 0.100 0.111
	1997 1998	0.040 0.263 0.154 0.074 0.091 0.059 0.029 0.357 0.111 0.129		1997	0.077
	1999 2000	0.034 0.228 0.250 0.100 0.074 0.067 0.167 0.097 0.344 0.308 0.172 0.033 0.048		1999	0.067 0.100
A C	2001	0.027 0.238 0.364 0.433 0.152 0.077		2000 2001	0.067 0.095 0.063
Age 6	1986 1987 1988	0.167 0.384 0.045 0.115 0.167 0.067 0.029 0.192 0.136 0.043 0.059	Age 16	1986 1987	0.056 0.037 0.133 0.333 0.235
1	1988 1989 1990	0.059 0.192 0.136 0.043 0.059 0.052 0.212 0.093 0.033 0.030 0.098 0.328 0.146 0.030 0.032 0.045	l	1988 1989 1990	0.050 0.250
1	1990 1991 1992	0.030 0.098 0.328 0.146 0.030 0.032 0.045 0.105 0.324 0.160 0.100 0.133 0.091 0.253 0.067 0.022 0.036		1991	0.067 0.111 0.182
	1992 1993 1994	0.027 0.231 0.133 0.138	l	1992 1993	0.036 0.022 0.034 0.050
1	1995	0.022 0.274 0.098 0.097 0.053 0.163 0.426 0.146 0.114	l	1994	
	1996	0.097 0.161 0.074 0.037 0.100		1995	0.167 0.056 0.024 0.059 0.273 0.200
	1997	0.053 0.077 0.111		1996 1997	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.125
	1998 1999	0.063 0.077 0.111 0.143 0.111 0.065 0.070 0.154 0.050 0.111		1996 1997 1998 1999	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.122 0.050 0.059
Ago 7	1998 1999 2000 2001	0.055 0.077 0.111 0.005 0.449 0.111 0.050 0.111 0.005 0.002 0.192 0.172 0.167 0.024 0.227 0.000 0.084 0.192 0.053	A 4-	1996 1997 1998 1999 2000 2001	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.125
Age 7	1998 1999 2000 2001 1986 1987	0.053 0.077 0.111 0.035 0.075 0.111 0.035 0.075 0.111 0.035 0.079 0.154 0.056 0.111 0.055 0.079 0.154 0.055 0.111 0.055 0.075	Age 17	1996 1997 1998 1999 2000 2001 1986 1987	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.122 0.004 0.055 0.056
Age 7	1998 1999 2000 2001 1986 1987 1988 1989	0.053 0.077 0.111 0.005 0.070 0.154 0.015 0.0111 0.005 0.070 0.154 0.055 0.111 0.005 0.070 0.154 0.055 0.111 0.005 0.024 0.027 0.020 0.0354 0.192 0.053 0.024 0.027 0.020 0.0354 0.192 0.053 0.026 0.026 0.035 0.0354 0.035 0.050 0.026 0.026 0.035 0.0354 0.0354 0.035	Age 17	1996 1997 1998 1999 2000 2001 1986 1987 1988 1989	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.125 0.039 0.059 0.125 0.004 0.055 0.100 0.007 0.130 0.176 0.019 0.125 0.167
Age 7	1998 1999 2000 2001 1986 1987 1988 1989 1990	0.055 0.077 0.111 0.055 0.035 0.077 0.111 0.055 0.035 0.070 0.154 0.050 0.111 0.055 0.070 0.154 0.050 0.111 0.052 0.129 0.172 0.167 0.052 0.052 0.072 0.075 0.055 0.054 0.075 0.075 0.055 0.076 0.075	Age 17	1996 1997 1998 1999 2000 2001 1986 1987 1988 1989 1990	0.024 0.059 0.273 0.200 0.059 0.275 0.059 0.125 0.059 0.125 0.059 0.1059 0.1059 0.1059 0.1059 0.1059 0.1059 0.1059 0.1059 0.1050
Age 7	1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993	0.055 0.077 0.111 0.055 0.035 0.070 0.111 0.055 0.035 0.070 0.154 0.050 0.111 0.055 0.070 0.154 0.050 0.111 0.052 0.112 0.071 0.072 0.072 0.072 0.075 0.072 0.075	Age 17	1996 1997 1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993	0.024 0.059 0.273 0.200 0.000 0.172 0.000 0.000 0.172 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.176 0.000 0.176 0.176 0.176 0.176 0.176 0.176 0.176 0.176 0.176 0.000
Age 7	1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993 1994 1994	0.055 0.077 0.111 0.005 0.140 0.111 0.050 0.111 0.050 0.111 0.050 0.111 0.050 0.111 0.050 0.111 0.050 0.150 0.172 0.167 0.167 0.024 0.272 0.200 0.346 0.152 0.053 0.167 0.182 0.250 0.350 0.346 0.120 0.053 0.050 0.050 0.050 0.340 0.102 0.053 0.050	Age 17	1996 1997 1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995	0.024 0.056 0.273 0.200 0.037 0.050 0.059 0.122 0.034 0.059 0.055 0.055 0.057 0.057 0.130 0.176 0.176 0.130 0.111 0.061 0.062 0.063 0.066 0.063 0.066 0.065 0.065 0.066 0.065 0.066 0.065 0.066 0.065 0.066 0.065 0.066 0.065 0.066 0.065 0.065 0.066 0.065 0.065 0.066 0.065
Age 7	1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996	0.055 0.077 0.111 0.005 0.017 0.114 0.005 0.111 0.005 0.017 0.114 0.005 0.111 0.005 0.111 0.020 0.127 0.000 0.145 0.167 0.167 0.024 0.277 0.000 0.145 0.145 0.053 0.038 0.222 0.029 0.029 0.045 0.043 0.042 0.025 0.029 0.029 0.045 0.043 0.041 0.020 0.140 0.019 0.097 0.045 0.020 0.140 0.140 0.091 0.097 0.045 0.020 0.140 0.140 0.091 0.097 0.045 0.020 0.140 0.140 0.010 0.097 0.045 0.020 0.140 0.140 0.010 0.097 0.045 0.020 0.140 0.140 0.010 0.011 0.015 0.203 0.150 0.043 0.151 0.025 0.055 0.055 0.055 0.055 0.044 0.156 0.055	Age 17	1996 1997 1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996	0.024 0.056 0.273 0.200 0.037 0.050 0.050 0.055 0.007 0.037 0.130 0.130 0.111 0.066 0.022 0.083 0.096 0.056 0.010 0.057 0.010 0.111 0.066 0.050 0.068 0.068 0.111 0.066 0.050 0.068 0.068 0.111 0.066 0.050 0.050 0.060 0.113 0.050
Age 7	1998 1999 2000 2001 1986 1987 1988 1989 1991 1992 1993 1994 1995 1996 1997 1998	0.055 0.077 0.111 0.005 0.070 0.174 0.071 0.050 0.111 0.005 0.070 0.174 0.020 0.111 0.050 0.111 0.024 0.272 0.200 0.045 0.047 0.063 0.038 0.222 0.029 0.029 0.045 0.043 0.020 0.059 0.070 0.074 0.074 0.087 0.087 0.045 0.080 0.024 0.104 0.097 0.077 0.074 0.087 0.045 0.080 0.024 0.104 0.097 0.077 0.074 0.087 0.045 0.080 0.024 0.104 0.099 0.087 0.045 0.080 0.025 0.038 0.038 0.039 0.038 0.048 0.105 0.050 0.043 0.048 0.105 0.050 0.043 0.048 0.105 0.050 0.043 0.048 0.105 0.050 0.043 0.048 0.105 0.050 0.059 0.111 0.195 0.057 0.176 0.059 0.111 0.195 0.057 0.176 0.059 0.112 0.208 0.059 0.2770 0.222 0.059 0.059 0.059 0.059	Age 17	1996 1997 1998 1999 2000 2001 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995	0.024 0.059 0.273 0.200 0.059 0.273 0.200 0.059
	1998 1999 2000 2001 1986 1987 1988 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000	0.055 0.077 0.111 0.005 0.070 0.174 0.007 0.014 0.005 0.070 0.174 0.007 0.014 0.005 0.070 0.074 0.007 0.005 0.008 0.008 0.008 0.009 0.005 0.008 0.008 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009 0.008 0.009 0.009 0.009 0.009 0.009		1996 1997 1998 2000 2001 1996 1997 1988 1989 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000	0.024 0.056 0.273 0.200 0.037 0.050 0.050 0.055 0.007 0.037 0.130 0.130 0.111 0.066 0.022 0.083 0.096 0.056 0.010 0.057 0.010 0.111 0.066 0.050 0.068 0.068 0.111 0.066 0.050 0.068 0.068 0.111 0.066 0.050 0.050 0.060 0.113 0.050
Age 7	1998 1999 2000 2001 1986 1987 1987 1989 1990 1991 1993 1994 1995 1996 1997 1998 1999 2000 2001	0.055 0.077 0.111 0.005 0.011 0.005	Age 17	1996 1997 1998 1999 2000 2001 1987 1987 1990 1991 1993 1993 1994 1995 1996 1997 1998 1999 2000 2001 1986	0.024 0.056 0.273 0.050 0.125 0.055 0.205 0.055 0.125 0.055
	1998 1999 1999 1990 1987 1987 1988 1989 1990 1991 1993 1994 1995 1996 1997 1998 1999 2000 2001 1987 1988 1989	0.055 0.077 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.112 0.005 0.102		1996 1997 1998 2000 2001 1986 1987 1987 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 1986 1987 1988	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.122 0.034 0.055 0.055 0.130 0.130 0.176 0.190 0.125 0.176 0.019 0.126 0.171 0.022 0.083 0.091 0.066 0.053 0.056 0.111 0.067 0.037 0.037 0.050 0.124 0.037 0.037 0.050 0.143 0.037 0.037 0.050 0.126 0.056 0.057 0.057 0.057
	1998 1999 2000 2001 1886 1887 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 1997 1988 1989 1999 2000 1997 1988 1989 1999 1999 1999 1999 1999	0.055 0.077 0.111 0.005 0.111		1996 1997 1997 2000 2001 1996 1997 1998 1990 1991 1992 1993 1994 1995 1996 1997 1998 1998 1999 2000 2001 1986 1997	0.024 0.056 0.273 0.200 0.037 0.050 0.059 0.122 0.034 0.059 0.130 0.055 0.130 0.130 0.176 0.176 0.130 0.130 0.111 0.061 0.022 0.083 0.064 0.114 0.022 0.083 0.064 0.114 0.037 0.037 0.037 0.050 0.143 0.200 0.037 0.037 0.050 0.055 0.055 0.067
	1998 1999 2001 2011 1886 1887 1989 1990 1991 1992 1993 1994 1995 1996 1997 1988 1999 2000 2011 1888 1899 1990 2019 1988 1999 1990 2019 1990 2019 1990 2019 2019	0.055 0.077 0.111		1996 1997 1998 1999 2000 2001 1996 1987 1988 1990 1991 1992 1993 1995 1996 1997 1997 1998 1999 2000 1991 1992 2001 1998 1999 1999 1999 1999 1999 1999 1	0.024 0.059 0.273 0.200 0.037 0.050 0.059 0.122 0.034 0.055 0.055 0.130 0.130 0.176 0.190 0.125 0.176 0.019 0.126 0.171 0.022 0.083 0.091 0.066 0.053 0.056 0.111 0.062 0.063 0.050 0.111 0.062 0.063 0.050 0.111 0.064 0.053 0.056 0.114 0.069 0.067 0.067
	1998 1999 2000 2011 1966 1976 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1988 1999 2000 2001 1988 1989 1990 1991 1992 1993 1994	0.055 0.077 0.111 0.005 0.070 0.174 0.071 0.050 0.111 0.005 0.071 0.174 0.050 0.111 0.007 0.174 0.075		1996 1997 1998 1999 2000 2001 1996 1987 1988 1990 1991 1992 1993 1995 1996 1997 1998 2000 1997 1998 1999 2001 1996 1997 1998 1999 2000 1998 1999 2001 1998 1999 2001 1998 2001 1998 2001 2001 2001 2001 2001 2001 2001 200	0.024 0.056 0.273 0.050 0.037 0.050 0.037 0.050
	1998 1999 2000 2011 1986 1987 1988 1993 1994 1995 1996 1997 1998 1999 2000 2001 1987 1988 1989 1999 1990 1987 1988 1989 1989 1989 1989 1989 1989	0.055 0.077 0.111		1996 1997 1998 2000 2001 1998 1999 2000 2001 1988 1989 1999 2000 2001 1998 1999 2000 2001 1987 1988 1989 1999 1999 1999 1999 199	0.024 0.056 0.273 0.200 0.037 0.050 0.050 0.055 0.055 0.055 0.057 0.059 0.125 0.130 0.130 0.132 0.111 0.062 0.063 0.065 0.065 0.069 0.069 0.060 0.060 0.067 0.067 0.067 0.067 0.067 0.066 0.066 0.066 0.066 0.066 0.069 0.066 0.066 0.066
	1998 1999 2000 2001 1986 1987 1988 1990 1991 1992 1993 1994 1995 1996 1996 1997 1987 1987 1998 1991 1991 1991 1991	0.055 0.077 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.112 0.005 0.102		1996 1997 1998 2000 2001 1996 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 1986 1989 1999 1999 2000 2001 1986 1987 1988 1989 1999 2000 2001 1986 1987 1988 1989 1999 2000 2001 1986 1987 1988 1989 1989 2000 2001 1986 1987 1988 1989 1989 2000 2001 1986 1987 1988 1989 1999 2000 2001 1986 1987 1988 1989 1989 2000 2001 1986 1987 1988 1989 1989 2000 2001 1986 1987 1988 1989 1989 1989 1989 1989 1989	0.024 0.056 0.273 0.200 0.037 0.050 0.075 0.037 0.130 0.176 0.130 0.125 0.176 0.130 0.131 0.061 0.022 0.083 0.081 0.061 0.050 0.083 0.081 0.061 0.050 0.083 0.081 0.081 0.050 0.083 0.081 0.081 0.050 0.083 0.085 0.085 0.085 0.050 0.085 0.085 0.085 0.050 0.085 0.085 0.085 0.050 0.085 0.085 0.085 0.050 0.085 0.085 0.085 0.085 0.050 0.085 0.085 0.085 0.085 0.050 0.050 0.045 0.055 0.050 0.056 0.045 0.050 0.056 0.045 0.050 0.056 0.056 0.056
	1998 1999 2000 2001 1966 1987 1988 1999 1990 1991 1992 1993 1994 1995 1996 1997 1988 1999 2000 2001 1986 1987 1988 1999 1990 1990 1990 1990 1990 1990	0.055 0.077 0.111		1996 1997 1998 2000 2001 1986 1989 1989 1989 1991 1992 2000 1991 1992 2000 1991 1992 2000 1991 1992 1993 1994 1995 1996 1996 1997 1998 1998 1998 1998 1998 1998 1998	0.024 0.056 0.273 0.050 0.037 0.050 0.037 0.037 0.130 0.130 0.131 0.022 0.083 0.099 0.125 0.111 0.091 0.022 0.083 0.093 0.091 0.143 0.091 0.007 0.097 0.097 0.090 0.0087 0.0087 0.0087 0.0087 0.0087 0.0088 0.0089 0.098 0.098 0.143 0.0099 0.098 0.098 0.098 0.143 0.0099 0.0
	1998 1999 2000 2001 1896 1897 1898 1899 1991 1992 1993 1994 1995 1996 1997 1988 1999 1999 1999 1999 1999 1999	0.055 0.077 0.111 0.050 0.111 0.055 0.111		1996 1997 1998 2000 2001 1986 1989 1986 1980 1991 1992 1993 1994 1995 2000 1996 1997 1998 1998 1998 1998 1998 1998 1998	0.024 0.056 0.273 0.050 0.037 0.050 0.034 0.055 0.055 0.057 0.039 0.176 0.019 0.125 0.176 0.019 0.022 0.083 0.056 0.056 0.055 0.056 0.057 0.037 0.037 0.050 0.45 0.039 0.055 0.056 0.056 0.056 0.057 0.037 0.037 0.050 0.45 0.058 0.058 0.056 0.059 0.059 0.055
Age 8	1998 1999 2000 2011 1986 1987 1988 1999 1999 1999 1999 2000 2001 1987 1988 1989 1999 1999 1999 1999 199	0.055 0.077 0.111 0.050 0.111 0.055 0.111	Age 18	1996 1997 1998 2000 1998 1999 1990 1996 1998 1990 1990 1990 1990 1990 1990 1990	0.024 0.056 0.273 0.050 0.176 0.055 0.176 0.055 0.176 0.055 0.176 0.055 0.176 0.055 0.055 0.176 0.176 0.176 0.055 0.055 0.055 0.055 0.176 0.176 0.176 0.055
Age 8	1998 1999 2000 2001 1886 1889 1990 1990 1991 1992 1993 2000 2001 1986 1989 1991 1992 1993 1994 1995 1996 1997 1998 1999 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 1999 1999 1999 1999 1999	0.055 0.077 0.111 0.050 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.111 0.005 0.112 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.182 0.005 0.184 0.181 0.184	Age 18	1996 1997 1998 19	0.024 0.056 0.273 0.050 0.037 0.050 0.039 0.176 0.055 0.050 0.039 0.176 0.055 0.176 0.176 0.052 0.083 0.093 0.093 0.093 0.093 0.093 0.093 0.093 0.093 0.093 0.093 0.093 0.095
Age 8	1998 1999 20001 1997 1987 1987 1987 1987 1989 1990 1990 2000 1991 1999 1999 1999 199	0.055 0.077 0.111	Age 18	1996 1997 1998 1997 1998 1997 1998 1997 1998 19	0.024 0.056 0.273 0.050 0.037 0.050 0.055 0.055 0.055 0.055 0.057 0.059 0.125 0.055 0.130 0.130 0.111 0.062 0.063 0.065 0.065 0.065 0.065 0.065 0.065 0.065 0.065 0.066 0.067 0.067 0.067 0.067 0.067 0.067 0.067 0.067 0.067 0.066 0.066 0.066 0.066 0.066 0.067 0.066
Age 8	1998 19	0.055 0.077 0.111 0.050 0.111 0.055 0.111	Age 18	1996 1997 1998 1999 1998 1998 1998 1998 1998	0.024 0.056 0.273 0.000 0.005 0.176 0.005
Age 8	1998 9 1997 1998 9 1998	0.055 0.077 0.111 0.050 0.111 0.050 0.111 0.055 0.055 0.111 0.055	Age 18	1986 1987 1988	0.024 0.056 0.273 0.050
Age 8	1998 1999 1999 1999 1999 1999 1999 1999	0.055 0.077 0.111 0.050 0.111 0.005 0.101 0.005	Age 18	1996 1997 1998 1997 1998	0.024 0.056 0.750 0.059 0.125 0.055
Age 8	1988 1988 1988 1988 1988 1988 1988 1988	0.055 0.077 0.111	Age 18	1996 1997 1998 1998 1998 1998 1998 1998 1998	0.024 0.056 0.273 0.050 0.037 0.050 0.039 0.125 0.055 0.055 0.055 0.130 0.130 0.176 0.151 0.067 0.067 0.063 0.064 0.069 0.073 0.069 0.069 0.073 0.069 0.069 0.073 0.069 0.066 0.055 0.066 0.067 0.067 0.067 0.067 0.067 0.067 0.068 0.068 0.068 0.069 0.068 0.068 0.069 0.068 0.068 0.069 0.068 0.068 0.069 0.068 0.068 0.069 0.068 0.068 0.069 0.068 0.068 0.069 0.069 0.068 0.068 0.069 0.068 0.068 0.069 0.069 0.068 0.068 0.069 0.069 0.068 0.068 0.069 0.069 0.069 0.068 0.068 0.069 0.069 0.069 0.068

Table 39. Age-Length-Keys for Eastern Gulf King Females use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

Data Age 0	YEAR 1986	Size Uppb 35 40 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 150 155 160 200	Data Age 10	YEAR 1986	Size Uppb 35 40 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 150 0.663	155 160 200
Age 0	1987 1988	1,000		1987 1988	0.167 0.091 0.063 0.077 0.133 0.133 0.250	
	1989 1990	1.000		1989 1990 1991	0.200 0.167 0.267 0.063 0.071 0.063	0.278
	1991 1992	1.000 1.000		1992	0.034 0.036 0.105 0.100 0.040 0.133 0.029 0.037 0.059 0.188 0.389 0.333 0.409 0.636	0.083
	1993 1994 1995	1,000 0,154 0,042 1,000		1993 1994	0.016 0.027 0.037 0.026 0.071 0.040 0.013 0.020 0.075 0.143 0.308 0.500 0.421 0.231	0.067
	1996 1996 1997 1998	1,000 0,182 1,000		1995 1996 1997	0.075 0.020 0.075 0.143 0.308 0.500 0.421 0.231 0.021 0.087 0.048	0.182
	1997 1998 1999	1,000 0.083 0.043 0.074 0.077 0.091 1,000 0.023 0.034 0.053 0.065		1998 1999	0.074 0.133 0.062 0.308 0.227 0.105 0.083 0.130 0.083	0.062 0.133
	2000 2001	1,000 1,000 1,000		2000 2001	0.067 0.222 0.038 0.059	0.188 0.250
Age 1	2002	1,000	Age 11	2002	0.125	0.091
	1987	1.000 0.938 0.533 0.100 0.057 0.154 0.800 0.500 0.324 0.048		1987 1988	0.045 0.125 0.050 0.083 0.133 0.067	
	1988 1989 1990	1.000 1.000 0.966 0.909 0.700 0.083 0.059 0.842 0.375 0.162		1989 1990	0.125 0.182 0.083 0.200 0.063 0.077	0.190
	1990 1991 1992	0.813 1.000 0.808 0.650 0.042 0.019 0.882 0.739 0.443 0.159 0.031		1991 1992	0.034 0.018 0.040 0.067 0.021 0.056 0.136 0.091	
	1993 1994	0.846 0.958 0.882 0.150 0.087 0.013 1,000 0.467 0.185 0.167		1993 1994	0.042 0.122 0.178 0.297 0.333 0.609 0.036 0.040	0.467
	1996 1996	1,000 0.467 0.185 0.167 0.816 0.667 0.583 0.269 0.273 0.075 1,000 1,000 0.907 0.656 0.374 0.080 0.075 0.081		1995 1996	0.024 0.026 0.038 0.105 0.007 0.107 0.071 0.217 0.429	0.500
	1997 1998	0.846 0.289 0.341 0.159 0.053 0.750 0.778 0.531 0.130 0.047		1997 1998	0.045	0.062
	1999 2000	1.000 1.000 1.000 0.867 0.500 0.652 0.363 0.143 0.027		1999 2000	0.062	0.333
	2001 2002	0.500 0.385 0.297 0.037 0.462 0.077		2001 2002	0.054 0.017	0.250
Age 2	1986 1987	0.067 0.300 0.688 0.125 0.063 0.467 0.880 0.887 0.692 0.611 0.267 0.077	Age 12	1986 1987	0.056 0.136 0.063 0.100 0.167 0.063 0.136 0.063 0.100 0.167	
	1988 1989	0.200 0.500 0.618 0.905 0.520 0.286 0.143 0.034 0.091 0.300 0.800 0.083 0.059 0.063		1988 1989	0.118 0.083 0.133	0.056
	1990 1991 1992	0.158 0.500 0.703 0.722 0.750 0.125 0.167 0.071 0.192 0.350 0.789 0.653 0.654 0.200 0.040 0.036		1990 1991	0.071 0.385 0.018 0.040 0.158 0.083 0.200	0.190 0.143 0.083
	1992 1993 1994	0.118 0.261 0.528 0.710 0.738 0.391 0.276 0.057 0.118 0.800 0.551 0.425 0.267 0.070 0.036		1992 1993 1994	0.045 0.021 0.049 0.044 0.027 0.185 0.043	0.067
	1995	0.507 0.648 0.333 0.117 0.032 0.017 0.333 0.438 0.673 0.591 0.375 0.400 0.120 0.026	I	1995	0.024 0.056	0.143 0.182 0.083
	1996 1997	0.093 0.333 0.496 0.602 0.472 0.570 0.440 0.164 0.154 0.711 0.699 0.829 0.814 0.442 0.208 0.064 0.050 0.156 0.312 0.485 0.290 0.77 0.452	l	1996 1997 1998	0.043 0.048 0.025 0.050 0.200	0.083 0.385 0.062
	1998 1999 2000	0.000 0.186 0.312 0.486 0.250 0.007 0.152 0.130 0.485 0.312 0.245 0.250 0.007 0.152 0.330 0.485 0.027 0.250 0.026 0.484 0.000 0.056 0.052 0.466 0.069 0.031 0.043	I	1999	0.043 0.083 0.111	0.067
	2000 2001 2002	0.348 0.500 0.569 0.612 0.466 0.096 0.031 0.043 0.500 0.564 0.392 0.350 0.181 0.132 0.054 0.538 0.923 0.913 0.573 0.289 0.119 0.024	1	2000 2001 2002	0.111 0.115 0.048 0.125 0.067	0.062 0.375
Age 3	2002 1986 1987	0.250 0.250 0.150 0.056 0.020 0.019 0.077 0.278 0.333 0.083 0.050	Age 13	2002 1986 1987	0.286 0.100 0.136 0.188 0.200 0.083 0	0.188
	1988 1989	0.059	1	1988 1989	0.118 0.091	0.091
	1990 1991	0.125 0.135 0.278 0.125 0.500 0.250 0.143 0.059 0.141 0.214 0.154 0.367 0.320 0.107 0.069 0.018	1	1990 1991	0.077 0.026 0.105 0.250 0.067	0.048 0.143
	1992 1993	0.019 0.130 0.215 0.494 0.414 0.617 0.200 0.111 0.050 0.275 0.400 0.533 0.268 0.145 0.016 0.021 0.024	I	1992 1993	0.059 0.111 0.056 0.045 0.091 0.027 0.043	0.250 0.067
	1994 1995	0.013 0.130 0.313 0.550 0.258 0.155 0.071 0.111 0.058 0.114 0.450 0.250 0.373 0.136 0.013 0.040 0.019 0.024	1	1994 1995	0.025 0.120 0.111 0.048 0.077 0.053 0.462	0.273
	1996 1997	0.011 0.104 0.239 0.346 0.228 0.280 0.231 0.043 0.021 0.012 0.097 0.442 0.607 0.582 0.200 0.069 0.025		1996 1997		
	1998 1999	0.156 0.391 0.625 0.635 0.242 0.333 0.043 0.241 0.344 0.286 0.250 0.042 0.143 0.062 0.053	I	1998 1999	0.045 0.042 0.043 0.083	0.250
	2000 2001	0.114 0.039 0.204 0.260 0.365 0.307 0.257 0.027 0.062	1	2000 2001	0.048 0.250	0.125
Age 4	2002 1986	0.087 0.343 0.444 0.405 0.171 0.067 0.067 0.063 0.625 0.500 0.389 0.063	Age 14	2002 1986	0.188 0.143	0.091
	1987 1988 1989	0.038 0.077 0.056 0.200 0.615 0.250 0.313 0.136 0.063 0.080 0.143 0.214 0.615 0.091 0.100 0.067 0.167 0.225 0.825 0.450 0.375 0.133		1987 1988	0.100 0.091 0.125 0.150 0.167 0 0.059	0.375
	1990	0.125 0.250 0.333 0.500 0.176 0.063 0.063		1989 1990 1991		0.056 0.048
	1991 1992	0.028 0.133 0.173 0.233 0.320 0.071 0.138 0.089 0.105 0.015 0.103 0.172 0.277 0.429 0.222 0.147		1992	0.026 0.083 0.067 0.037 0.063 0.136	0.167
	1993 1994	0.015 0.103 0.172 0.277 0.428 0.222 0.147 0.007 0.105 0.173 0.507 0.48 0.338 0.208 0.032 0.054 0.013 0.037 0.188 0.283 0.452 0.44 0.357 0.083 0.026 0.128 0.023 0.106 0.275 0.277 0.388 0.026 0.050 0.050 0.128 0.023 0.106 0.275 0.277 0.388 0.055 0.050 0.050 0.128		1993 1994	0.022 0.027 0.074 0.043 0.036 0.015 0.038 0.053 0.077	0.067 0.143
	1995 1996	0.026 0.080 0.107 0.087 0.170 0.239 0.191 0.106 0.107		1995 1996 1997	0.015 0.038 0.053 0.077 0.043 0.095	0.091 0.250
	1997 1998	0.035 0.106 0.152 0.282 0.389 0.448 0.150 0.050 0.200 0.037 0.043 0.062 0.212 0.384 0.208 0.304 0.111 0.067 0.062 0.023 0.103 0.406 0.457 0.380 0.333 0.288 0.188 0.105 0.083		1998	0.045	0.062
	1999 2000 2001	0.023 0.103 0.406 0.487 0.383 0.333 0.238 0.188 0.105 0.083 0.039 0.041 0.110 0.427 0.402 0.214 0.279 0.153 0.111 0.027 0.065 0.111 0.278 0.256 0.179 0.155 0.192 0.059 0.048		1999 2000 2001	0.067	0.067 0.062
Age 5	2002	0.077 0.218 0.298 0.488 0.389 0.316 0.067	Age 15	2002 1986		
Inge 5	1987 1988	0.066 0.087 0.089 0.083 0.375 0.680 0.333 0.063 0.063 0.076 0.071 0.077 0.070 0.008 0.133 0.067 0.083 0.090 0.125 0.350 0.350 0.277 0.277 0.087 0.087 0.155 0.080 0.124 0.320 0.214 0.182 0.350 0.214	Age 15	1987 1988	0.050 0.063 0.200 0.083 0 0.067 0.059	0.188
	1989 1990	0.083 0.059 0.125 0.350 0.250 0.267 0.273 0.067 0.125 0.083 0.214 0.284 0.182 0.250 0.214		1989 1990	0.007	0.111 0.048
	1991 1992	0.133 0.2000 0.357 0.310 0.196 0.053 0.100 0.040 0.011 0.069 0.021 0.057 0.185 0.147 0.125 0.056		1991 1992	0.045 0.091	0.167
	1993 1994	0.027 0.127 0.291 0.344 0.188 0.122 0.067 0.027 0.050 0.210 0.310 0.310 0.250 0.462 0.103 0.036		1993 1994	0.037 0.130 0.040 0.080 0.111	0.133 0.143
	1995 1996 1997	0.050 0.193 0.242 0.269 0.240 0.189 0.119 0.128 0.023 0.065 0.172 0.447 0.191 0.107 0.036		1995 1996	0.013 0.077	0.091
	1997 1998 1999	0.010 0.028 0.045 0.231 0.138 0.225 0.250 0.016 0.077 0.152 0.292 0.435 0.222 0.133 0.062		1997 1998		0.077
	2000	0.171 0.321 0.458 0.238 0.312		1999 2000	0.333	
	2001 2002 1986	0.028 0.058 0.049 0.228 0.250 0.224 0.154 0.095 0.250 0.007 0.049 0.155 0.220 0.250 0.158 0.400 0.133		2001 2002		
Age 6	1987	0.100 0.111 0.125 0.067 0.125 0.227 0.083 0.091 0.063	Age 16	1986 1987 1988	0.071 0.050	
	1988 1989	0.231 0.384 0.700 0.667 0.267 0.200 0.259 0.118 0.059 0.125 0.067 0.091 0.083 0.335 0.273 0.188 0.071 0.188		1989	0.083 0.059 0.067 0.071 0.083	0.182
	1990 1991	0.120 0.250 0.241 0.214 0.263 0.350 0.160 0.053 0.083		1990 1991	0.0/1 0.063	0.143
	1992 1993 1994	0.017 0.064 0.171 0.370 0.294 0.313 0.167 0.111 0.091 0.013 0.028 0.018 0.082 0.083 0.122 0.089 0.081 0.043 0.023 0.089 0.119 0.306 0.292 0.154 0.290 0.095	1	1992 1993 1994	0.026 0.111	
	1994 1995 1996	0.032 0.069 0.119 0.306 0.282 0.154 0.200 0.036 0.052 0.154 0.200 0.036 0.025 0.024 0.227 0.256 0.300 0.284 0.095 0.103 0.115 0.158 0.010 0.040 0.119 0.170 0.277 0.357 0.258 0.043 0.048 0.040 0.045 0.045	l	1994 1995 1996	U.U.20 U.111	0.091
	1997 1998	0.006 0.018 0.172 0.175 0.100	1	1997		0.062
	1999 2000	0.057 0.036 0.083 0.048 0.125 0.105 0.167 0.043 0.083 0.067	1	1998 1999 2000		
L	2001 2002	0.035 0.054 0.143 0.241 0.154 0.471 0.238 0.024 0.024 0.222 0.368 0.200 0.091	L	2001 2002 1986		
Age 7	1986 1987	0.050 0.056 0.188 0.071 0.083 0.125 0.091 0.167 0.350 0.045 0.063	Age 17	1987	0.063 0.083 0	0.063
	1988 1989			1988 1989	0.059	0.222
	1990 1991	0.083 0.059 0.091 0.071 0.125 0.077 0.033 0.071 0.125 0.132 0.050 0.080 0.167	1	1990 1991	0.040	0.048
	1992 1993 1994	0.073 0.115 0.208 0.171 0.222 0.189 0.185	I	1992 1993		0.067
	1994 1995 1996	0.048 0.028	1	1994 1995		0.143 0.091
	1996 1997 1998	0.005 0.052 0.064 0.298 0.250 0.179 0.261 0.143 0.085 0.046 0.103 0.200 0.150 0.100	1	1996 1997		
	1998 1999 2000	0.042 0.148 0.133 0.259 0.077 0.227 0.125 0.042 0.288 0.002 0.053 0.0167 0.030 0.167 0.027 0.011 0.016 0.057 0.027 0.188 0.111 0.200 0.111 0.222 0.312]	1998 1999		
	2001	0.027 0.011 0.016 0.057 0.027 0.188 0.111 0.200 0.111 0.222 0.312 0.022 0.089 0.207 0.115 0.176 0.238 0.125 0.073 0.111 0.105 0.133 0.333 0.273		2000 2001 2002		
Age 8	2002 1986 1987	0.050 0.150 0.273 0.050 0.188 0.071 0.067 0.045 0.167 0.200 0.273 0.125 0.100	Age 18	1986 1987	0.071 0.100 0.083 0	0.063
	1987 1988 1989	0.091 0.083 0.182 0.083 0.133 0.133 0.33 0.425 0.250 0.308	1	1988 1989	0.067	0.273
	1989 1990 1991	0.071 0.059 0.455 0.438 0.429 0.250 0.308 0.018 0.040 0.053 0.083	1	1990 1991	0.053	0.190 0.143
	1991 1992 1993	0.029 0.037 0.088 0.125 0.167 0.167 0.091 0.018 0.016 0.146 0.268 0.289 0.162 0.037 0.087	I	1992 1993	****	0.083
	1994 1995 1996 1997	0.034 0.048 0.056 0.128 0.205 0.080 0.143 0.120 0.111 0.143 0.015 0.026 0.038 0.048 0.103 0.154	1	1994		0.286
	1996 1997	0.015 0.026 0.038 0.048 0.103 0.154 0.015 0.064 0.106 0.071 0.402 0.217 0.095 0.085 0.009 0.015 0.068 0.175 0.150 0.200 0.388		1995 1996 1997		
	1998 1999		1	1998 1999		
	2000 2001	0.027 0.111 0.200 0.222 0.036 0.103 0.154 0.118 0.095	J	2000 2001		
Age 9	2002 1986 1987	0.028 0.067 0.267 0.182 0.056 0.063 0.071 0.083 0.150 0.091 0.250	Age 19	2002 1986	0.071 0.050	1.000
	1987 1988 1989	0.083 0.159 0.091 0.250 0.182 0.133 0.200 0.167 0.176 0.067 0.083 0.111	ı	1987 1988 1989	0.050 0 0.083 0.059 0.067	0.063 1.000 0.182 1.000
	1990 1991	0.097 0.088 0.077 0.048 0.033 0.107 0.172 0.268 0.289 0.400 0.520 0.579 0.250 0.400 0.440		1989 1990 1991	0.067	0.048 0.429
	1991 1992 1993 1994	0.016 0.083 0.024 0.067 0.081 0.111	1	1991 1992 1993	0.067	0.429 0.167 0.067
	1995	0.016 0.024 0.111 0.051 0.282 0.400 0.282 0.400 0.222 0.038 0.075 0.071 0.128 0.038 0.077	1	1993 1994 1995	0.053	0.067
	1996 1997	0.087 0.095 0.015 0.075 0.250 0.300 0.15		1996 1997	u.uss	
1	1998 1999 2000	0.333 0.250 0.154 0.182 0.188 0.062 0.053 0.167 0.217 0.083		1998 1999		
	1 2000	0.014 0.027 0.111 0.333 0.375	1	2000 2001	0.038	
	2001 2002	0.038 0.059 0.095 0.250 0.053 0.067 0.133 0.275		2001		1

Table 40 Age-Length-Keys for Eastern Gulf King Males use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

Data		Size Uppb	2005		VEAD.	Size Uppb
Age 0	YEAR 1986 1987	1.000 1.000	200 E	Oata Age 10	YEAR 1986 1987	35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 125 130 155 200 0.071
	1988 1989	1.000 0.091			1988 1989	0.042 0.091 0.100 0.167 0.056
	1990 1991 1992	1.000 1.000 0.108 1.000			1990 1991 1992	0.077 0.037 0.111 0.050 0.100 0.036 0.130 0.333 0.385 0.250
	1993 1994	1.000 0.143 1.000			1993 1994	0.000 0.054 0.059
	1995 1996 1997	1.000 0.083 0.056 1.000			1995 1996	0.020 0.048 0.286 0.333 0.300 0.056 0.091 0.077
	1998 1999	1.000 1.000 1.000 0.062			1997 1998 1999	0.125
	2000 2001	1.000 1.000			2000 2001	0.067 0.167 0.017 0.111 0.200
Age 1	2002 1986 1987	1,000 0,625 0,929 0,214 0,172 0,200	7	\ge 11	2002 1986 1987	0.019 0.143
	1988 1989	0.118 1.000 0.909 1.000 0.933 0.867 0.111			1988 1989	0.083 0.389
	1990 1991 1992	0.905 0.200 0.892 0.889 0.514 0.105 0.333 0.109			1990 1991 1992	0.231 0.200 0.100 0.143 0.077 0.083
	1993 1994	0.786 0.533 0.060 0.929 0.571 0.364 0.026 0.018			1993 1994	0.138 0.440 0.385 0.455
	1995 1996 1997	0.667 0.278 0.261 1.000 0.905 0.267 0.081 0.778 0.214 0.125 0.017			1995 1996 1997	0.48 0.071 0.045 0.231 0.111 0.100
	1998 1999	0.714 0.562 0.182 0.014 1.000 1.000 0.708 0.360			1998 1999	0.111
	2000 2001 2002	0.556 0.241 0.273 0.032 0.400 0.182 0.195 0.024 0.007 0.714 0.055 0.015			2000 2001 2002	0.022 0.017 0.111 0.133
Age 2	1986 1987	0.125 0.077 0.071 0.786 0.759 0.800 0.200 0.071	7	\ge 12	1986 1987	0.071
	1988 1989 1990	0.882 0.800 0.083 0.067 0.133 0.778 0.455 0.095 0.500 0.941 0.571			1988 1989 1990	0.100 0.063 0.056 0.200
	1991 1992	0.111 0.486 0.895 0.733 0.410 0.069 0.667 0.826 0.818 0.226 0.178			1991 1992	0.037 0.250 0.250 0.048
	1993 1994	0.071 0.333 0.300 0.264 0.062 0.071 0.429 0.409 0.385 0.018			1993 1994 1995	0.103 0.080 0.115 0.091 0.200 0.667
	1995 1996 1997	0.250 0.611 0.522 0.450 0.143 0.037 0.095 0.883 0.613 0.356 0.225 0.036 0.222 0.786 0.850 0.864 0.542 0.235			1996 1997	0.077 0.056 0.300
	1998 1999 2000	0.286 0.312 0.500 0.145 0.108 0.034 0.250 0.520 0.345 0.333 0.621 0.545 0.613 0.147			1998 1999 2000	0.118 0.167
	2001 2002	0.500 0.795 0.341 0.166 0.073 0.286 0.855 0.824 0.272 0.068			2001 2002	0.167 0.267 0.143
Age 3	1986 1987 1988	0.250 0.063 0.069 0.133 0.400 0.200 0.167 0.059	ľ	Age 13	1986 1987 1988	0.083 0.059 0.100
	1989 1990	0.111 0.455 0.467 0.077 0.300 0.059 0.286 0.500			1989 1990	0.133
1	1991 1992 1993	0.267 0.462 0.207 0.033 0.037 0.065 0.182 0.717 0.600 0.043 0.133 0.600 0.547 0.554 0.047 0.103			1991 1992 1993	0.037 0.056 0.300 0.200 0.250 0.077 0.167
	1994	0.227 0.205 0.291 0.034			1993 1994 1995	0.115 0.100 0.111 0.143 0.333 0.300
1	1995 1996 1997	0.056 0.217 0.400 0.238 0.111 0.150 0.274 0.593 0.475 0.143 0.063 0.025 0.136 0.305 0.500 0.167 0.022			1996 1997	
	1998 1999 2000	0.062 0.273 0.788 0.541 0.379 0.125 0.042 0.120 0.483 0.281 0.088 0.111 0.138 0.136 0.226 0.256 0.111 0.200			1998 1999 2000	0.444
	2001	0.100 0.023 0.415 0.586 0.417 0.154 0.103 0.111 0.091 0.132 0.515 0.314 0.250 0.074			2001 2002	0.143
Age 4	1986 1987 1988	0.769 0.375 0.214 0.067 0.200 0.4000 1.33 0.083 0.083	,	\ge 14	1986 1987 1988	0.111 0.167 0.100
	1989 1990	0.208 0.118 0.091 0.533 0.154 0.083 0.167 0.143 0.400 0.400 0.143			1989 1990	
	1991 1992 1993	0.128 0.379 0.067 0.057 0.178 0.286 0.043 0.040 0.132 0.308 0.326 0.069 0.080 0.038			1991 1992 1993	0.050 0.154 0.250 0.120 0.138
	1994 1995	0.359 0.509 0.345 0.162 0.150 0.381 0.278 0.137 0.190			1994 1995	0.136 0.200 0.048 0.111
	1996 1997 1998	0.032 0.051 0.175 0.161 0.083 (0.119 0.206 0.524 0.267 0.045 0.088 0.243 0.276 0.125 0.250	.077		1996 1997 1998	
	1999 2000		.059		1998 1999 2000	0.118
Ann E	2001 2002 1986	0.049 0.162 0.291 0.154 0.103 0.185 0.015 0.154 0.500 0.423 0.333 0.154 0.188	_	45	2001 2002	
Age 5	1987 1988	0.200 0.200 0.429 0.083 0.111 0.167	,	Age 15	1986 1987 1988	0.071 0.083 0.100
	1989 1990	0.077 0.167 0.100 0.300 0.429 0.276 0.600 0.074 0.028			1989 1990	
	1991 1992 1993	0.214 0.043 0.038 0.046 0.279 0.103 0.077			1991 1992 1993	0.050 0.100 0.083 0.115 0.091
	1994 1995	0.145 0.414 0.216 0.176 0.190 0.370 0.157 0.071			1994 1995	0.059 0.167
	1996 1997 1998	0.017 0.029 0.143 0.200 0.389 0.014 0.108 0.207 0.125 0.125	.100		1996 1997 1998	
	1999 2000	0.032 0.206 0.148 0.333	.118 .167		1999 2000	
Age 6	2001 2002 1986	0.125 0.143	214 F	Age 16	2001 2002 1986	
	1987 1988	0.100 0.357 0.417 0.292 0.588 0.364 0.100 0.083			1987 1988 1989	0.083 0.100 0.056
	1989 1990 1991	0.200 0.077 0.069 0.100 0.185 0.028			1999 1991	0.056
	1992	0.022 0.464 0.435 0.095 0.077 0.019 0.015 0.140 0.069			1992 1993	0.077
	1994 1995 1996	0.026 0.018 0.103 0.189 0.176 0.048 0.111 0.314 0.333 0.214 0.075 0.375 0.417 0.091	154		1994 1995 1996	0.111
	1997 1998	0.034 0.250 0.125	.050		1997 1998	0.111
1	1999 2000 2001	0.111 0.067 0.007 0.046 0.275 0.207 0.037	.118		1999 2000 2001	0.067
Age 7	2002 1986 1987	0.007 0.034 0.077 0.185 0.188 0.100 0.250 0.222 0.167		Age 17	2002 1986	Cour
	1988	0.042 0.118 0.364 0.538 0.500 0.417	.111		1987 1988 1989	0.056
1	1989 1990 1991	0.143 0.067 0.111 0.056			1990 1991	Wood
	1992 1993 1994	0.054 0.100	.045		1992 1993 1994	
	1995 1996	0.074 0.176 0.048 0.143 0.054 0.167 0.455	.077		1995 1996	0.100
	1997 1998 1999	0.029 0.071	111		1997 1998 1999	
	2000 2001	0.029 0.185 0.133 0.007 0.099 0.207 0.185	.167 .200		2000 2001	
Age 8	2002 1986 1987	0.214 0.167 0.222 0.167	286 A	\ge 18	2002 1986 1987	0.063
	1988 1989 1990	0.059 0.077 0.167	167		1988 1989	
	1991 1992	0.074	.267		1990 1991 1992	0.067 0.083
	1993 1994	0.023 0.138	.136 .056		1993 1994	0.003
	1995 1996 1997	0.019 0.078 0.095 0.071 0.111 0.018 0.056 0.089 0.111	.077		1995 1996 1997	0.050
	1998 1999	0.029 0.143	.300 .111 .059		1998 1999	Wood
	2000 2001 2002	0.067 0.013 0.143 0.121 0.074 0.037	.143		2000 2001 2002	
	1986 1987	0.063 0.071 0.222	7	Age 19	1986 1987	1.000 1.000
Age 9	1988	0.182 0.200	.056		1988 1989 1990	0.100 1.000 0.056
Age 9	1989 1990	0143 0164			1990	
Age 9	1989 1990 1991 1992	0.143 0.154 0.133 0.407 0.472 0.300 0.500 0.043 0.095 0.077	.500		1992	0.250 0.083
Age 9	1989 1990 1991	0.133 0.407 0.472 0.300 0.500 0.494 0.095 0.077 0.034 0.160 0.034 0.027 0.176 0.200	200		1992 1993 1994	0.083 0.045
Age 9	1989 1990 1991 1992 1993 1994 1995 1996 1997	0.130 0.407 0.472 0.300 0.500 0.000 0.004 0.004 0.005 0.007 0.005 0.007 0.005 0.007 0.005 0.007 0.005 0.007 0.005 0.007 0.005 0.007 0.005	200 .077 .100		1992 1993 1994 1995 1996 1997	0.083
Age 9	1989 1990 1991 1992 1993 1994 1995	0.130 0.407 0.472 0.300 0.500 0.000 0.004 0.004 0.005 0.007 0.004 0.005 0.007 0.004 0.100 0.005 0.007 0.004 0.100 0.005 0.007 0.004 0.100 0.100 0.005 0.100 0.005 0.100 0.005	200		1992 1993 1994 1995 1996	0.083 0.045

Table 41 Age-Length-Keys for Western Gulf King Females use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

Mart		To To	*			To a second seco
March 1968	ta IY		Size Uppb 35 40 45 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 140 155 200	Data	YEAR	Size Uppb 35 40 45 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 140 155 200
Mary 100		1986	1.000		1986	6 0.143
## 1 1996 1996			1.000			7 0.083 0.071 0.125
May 1 100 10		1989	1.000		1989	0.048 0.067 0.111 0.250
May 1 100 10		1990	1.000		1990	0.066 0.100 0.063
100 100		1991			1991	1 0.091 0.200 2 0.143 0.200
Mart		1993			1993	13
Apr 2 1 100	_					
March Marc	e 1	1986		Age 11		
March 100		1988	0.750		1988	0.077 0.167 0.056
March Marc			0.167 0.037		1989	9 0.143 0.048 0.176 0.200 0.111 0.200 0.188 0.100 0.063
March 100 10			0.750 0.427 0.857 0.900 0.267		1991	0.001
1985 1985		1992	1.000 0.700 0.091		1992	12
## 1982 1982		1993	0.167			
## 1988	e 2	1986	0.154	Age 12	1986	6
1986 1986		1987	0.500 0.593 0.160 0.172 0.214		1987	77 0.083 0.071 0.115 0.083 0.167
1996 1996					1988	0.059 0.067 0.200
1906 1906						
1906 1906		1991	0.143 0.100 0.600 0.465 0.388 0.059 0.154			
March Marc			0.833 0.727 0.600 0.056	ı	1993	3
1987 1988		1994	0.429 0.375 0.500		1994	14
1988	e 3		0.231 0.250 0.100 0.259 0.600 0.310 0.393 0.176 0.182 0.091	Age 13	1986	6 7
1996 1996		1988	0.100 0.286 0.429 0.320 0.190 0.167	ı	1988	0.115 0.083 0.111
1998 1998		1989	0.333 0.300 0.444 0.429 0.292 0.071			
982 982			0.455 0.429 0.278 0.125 0.077 0.067 0.419 0.526 0.353 0.269 0.211 0.048	ı	1991	0.067
984 984 984 985 980 944 945 985 980 944 945		1992	0.545 0.600 0.467 0.370 0.160	ı	1992	0.200
Age 1 1986				l	1993	3
1988	e 4	1986	0.077 0.167 0.500	Age 14	1986	6
1886 1886		1987	0.100 0.111 0.160 0.448 0.286 0.442 0.384 0.182 0.091	l	1987	77 0.071 0.125 0.053 0.038 0.167 0.167
1996 1996					1989	0.063
1902 1906		1990	0.053 0.357 0.111 0.500 0.538 0.111 0.063		1990	0.063
1900 0.112 0.200 0.04 0.04 0.000 0.0						
1964		1993	0.182 0.200 0.444 0.500 0.286		1993	13
1987 1988 1989 19	_	1994	0.556		1994	6 0.071
1988	e 5	1986 1987	0.000 0.000 0.004 0.402	Age 15	1986	0.9/1
1909		1988	0.120 0.238 0.167 0.200 0.158 0.038		1988	0.111
1991 1992 1993 1994						
1902		1991	0.088 0.115 0.263 0.619 0.077 0.067	1	1991	11
1996 1996		1992	0.080 0.067 0.296 0.120 0.385 0.111 0.250	l	1992	12
Age 6 1986 1987 1987 1988 1987 1988 1988 1988 1988		1993	0.167 0.250 0.286 0.526	1	1993	33 44
1888	e 6		9,971		1986	6
1888 0.024 cold 0.087 0.714 cold 0.085 0.18 0.113 0.111 1898 1898 1898 1899 189			0.036 0.118 0.364 0.182 0.167 0.250			
1950		1989	0.024 0.083 0.087 0.214 0.095 0.118 0.133 0.111		1989	0.111
1992 1993 1994 1996 1997 1998 1998 1999 1999 1999 1999 1999		1990	0.111 0.125 0.077 0.333 0.100 0.063		1990	0.063
1920		1991	0.088 0.077 0.105 0.088 0.308 0.308 0.304 0.074 0.280 0.231 0.556 0.429 0.125		1991	11 22
Age 7 1586 0.035 0.200 0.214 Age 7 1586 1587 0.006 0.150 0.151 0.151 1586 1687 0.006 0.150 0.151 0.151 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007 0.152 1586 0.007		1993			1993	3
1987 1988 1989	n 7			Age 17		
1989		1987	0.036		1987	0.071
1996		1988	0.120 0.263 0.115 0.111	ı	1988	0.083 0.067 0.250
1991		1990	0.278 0.333 0.100 0.125		1990	10
1909			0.211 0.048 0.308 0.182 0.067		1991	11
Age 8 1994		1992	0.200 0.077 0.222 0.143 0.500 0.056		1992	121 231
1987		1994	0.105		1994	4
1988	8 8	1986	0.143	Age 18	1986	6 0.071
1990 0 0.111 0.072 0.000 0.130 1990 0.030 0.130		1988	0.040 0.053	ı	1988	18
1997 0077 0172 027 027 027 027 027 027 027 027 027 0				1		
1992 0.037 0.231 0.111 0.000 1992 1993 1994 1994 1994 1994 1994 1994 1994 1995 199		1991	0.077 0.077 0.182 0.133	ı	1991	0.133
1994		1992	0.037 0.231 0.111 0.600	1	1992	12
Age 9 1986 0.143 Age 19 1986 1987 0.091 0.273 0.091 0.233 0.214 0.25 1987 1988 0.080 0.18 0.15 1989 0.080 0.18 0.15 1989 0.048 0.090 0.07 1989 0.048 1989 0.048 0.091 0.091 0.091 1990 0.066 0.048 0.091 0.007 0.031 1990 0.091 0.091 1991 0.048 0.091 0.097 1991		1993	0.071	ı	1993	3 4
1987	e 9	1986	0.143	Age 19	1986	1.000
1989 0.043 0.048 0.059 0.077 1989 1980 0.05 0.04 0.070 0.077 1980 1980 0.070 0.077 1980				ı		
1990 0.056 0.100 0.313 1990 1991 0.048 0.091 0.067 1991		1989	0.043 0.048 0.059 0.067	ı	1989	0.063
1991 0.048 0.091 0.067 1991			0.056 0.100 0.313	1	1990	0.063
		1991 1992	0.048 0.091 0.067	l	1991 1992	III
1993 0.125 0.143 1993		1993	0.125 0.143		1993	13
1994		1994		Щ	1994	14

Table 42 Age-Length-Keys for Western Gulf King Males use for ageing mackerel CAS by sex data. Rows: age and year Columns size-bin, values probability of fish age for each size-bin and year.

	ı	Size Uppb		1	Size Uppb	—
Data	YEAR 1986		Data Age 10	YEAR 1986	40 45 60 65 70 75 80 85 90 95 100 125 130 155	200
Age 0	1987	1.000	Age 10	1987	0.231 0.091 0.118 0.231 0.278 0.235	
	1988 1989			1988 1989	0.071 0.067 0.111	0.063
	1990 1991	1.000 1.000		1990 1991	0.111 0.038 0.167	
	1992 1993	1.000		1992 1993	0.053	
	1994	1.000		1994		
Age 1	1986 1987	0.267 0.100	Age 11	1986 1987	0.077	
	1988 1989	1.000 1.000 0.250 0.050		1988 1989		0.125
	1990 1991	0.250 0.083		1990 1991	0.083	
	1992	0.074 1.000 0.444 0.059		1992	0.250	
	1993 1994	0.167 0.200		1993 1994		
Age 2	1986 1987	0.467 0.250 0.250 0.188 0.050	Age 12	1986 1987	0.111 0.154 0.091	
	1988 1989	0.200 0.056 0.154		1988 1989		0.063
	1990	0.500 0.250 0.043		1990	0.333	0.308
	1991 1992	0.630 0.455 0.071 0.038 0.556 0.588 0.320		1991 1992	0.050 0.053 0.083	0.182
	1993 1994	0.667 0.231 0.077 0.333 0.600		1993 1994		0.167
Age 3	1986 1987	0.133 0.063 0.350 0.500 0.429 0.313	Age 13	1986 1987	0.077 0.091	
	1988 1989	0.400 0.222 0.059 0.750 0.385 0.300		1988 1989		0.125
	1990	0.250 0.250 0.043		1990		
	1991 1992	0.222		1991 1992		0.182
	1993 1994	1.000 0.333 0.538 0.615 0.500 0.200 0.455 0.111		1993 1994		0.167
Age 4	1986 1987		Age 14	1986 1987		
	1988 1989	0.200 0.278 0.176 0.077		1988 1989	0.056 0.059	
	1990	0.231 0.350 0.167 0.214 0.250 0.130 0.222 0.074 0.045 0.214 0.083 0.091		1990		0.063 0.077
	1991 1992	0.080 0.318 0.100 0.053		1991 1992		0.091
	1993 1994	0.231 0.154 0.308 0.100 0.545		1993 1994		0.167
Age 5	1986 1987		Age 15	1986 1987	0.091	\neg
	1988	0.067 0.389 0.235 0.077		1988	0.176	
	1989 1990	0.154 0.250 0.278 0.214 0.133 0.111 0.083 0.261 0.083 0.222 0.154		1989 1990		0.188
	1991 1992	0.214 0.308 0.083 0.083 0.040 0.182 0.150 0.263		1991 1992		0.091
	1993 1994	0.154 0.308 0.100 0.444		1993 1994		
Age 6	1986 1987		Age 16	1986 1987		
	1988 1989	0.133		1988 1989	0.118	
	1990	0.083 0.391 0.250 0.231		1990		
	1991 1992	0.045		1991 1992		
	1993 1994	0.077 0.200 0.167 0.333		1993 1994		
Age 7	1986 1987	0.333 0.150 0.333 0.077	Age 17	1986 1987		
	1988 1989	0.294 0.231 0.111 0.176 0.050 0.167 0.143 0.400 0.111 0.063		1988 1989		ļ
	1990	0.043 0.083 0.111		1990		
	1991 1992	0.071 0.192 0.417 0.083 0.091 0.150 0.263 0.400		1991 1992		ļ
	1993 1994	0.308 0.200 0.111		1993 1994		0.167
Age 8	1986 1987		Age 18	1986 1987	0.056 0.091	
	1988 1989	0.154 0.167 0.059 0.111 0.143 0.067 0.250		1988 1989		ļ
	1990	0.043 0.333 0.231		1990		ļ
	1991 1992	0.038 0.167 0.250 0.200 0.158 0.250		1991 1992		ļ
	1993 1994	0.300		1993 1994		
Age 9	1986 1987	0.056 0.063 0.111 0.077	Age 19	1986 1987		1.000
	1988	0.077 0.278 0.059		1988	0.056	1.000
	1989 1990	0.056 0.133 0.222 0.063 0.043 0.167		1989 1990		
	1991 1992	0.167 0.182 0.158 0.167		1991 1992		0.091
	1993	0.100 0.167		1993 1994		
	1994			1994		

Table 43. Ageing protocol used to transform king mackerel Catch at Size by sex to Catch at Age in the last stock assessment for the Atlantic and Gulf migratory groups. Key: Age-Length-Keys. SAR: Stochastic Ageing Method.

Instruction File for King mackerel

Year	A	Area	Q1	Q2	Q3	Q4	Area	Q1	Q2	Q3	Q4	Area	Q1	Q2	Q3	Q4
1985	1985	ATL	SAR	SAR	SAR	SAR	EGF	SAR	SAR	SAR	SAR	WGF	SAR	SAR	SAR	SAR
1986	1986	ATL	SAR	KEY	KEY	SAR	EGF	SAR	KEY	KEY	SAR	WGF	SAR	KEY	KEY	SAR
1987	1987	ATL	SAR	KEY	KEY	SAR	EGF	SAR	KEY	KEY	SAR	WGF	SAR	KEY	KEY	SAR
1988	1988	ATL	SAR	KEY	KEY	KEY	EGF	KEY	SAR	SAR	KEY	WGF	KEY	SAR	SAR	KEY
1989	1989	ATL	SAR	KEY	KEY	KEY	EGF	SAR	KEY	KEY	KEY	WGF	SAR	KEY	KEY	KEY
1990	1990	ATL	SAR	KEY	KEY	KEY	EGF	SAR	KEY	KEY	SAR	WGF	SAR	KEY	KEY	SAR
1991	1991	ATL	SAR	KEY	KEY	KEY	EGF	SAR	KEY	KEY	SAR	WGF	SAR	KEY	KEY	SAR
1992	1992	ATL	SAR	KEY	KEY	KEY	EGF	KEY	KEY	KEY	SAR	WGF	SAR	KEY	KEY	SAR
1993	1993	ATL	SAR	KEY	KEY	KEY	EGF	KEY	KEY	KEY	KEY	WGF	SAR	SAR	KEY	SAR
1994	1994	ATL	SAR	KEY	KEY	KEY	EGF	KEY	KEY	KEY	KEY	WGF	SAR	SAR	SAR	SAR
1995	1995	ATL	SAR	KEY	KEY	KEY	EGF	SAR	KEY	KEY	KEY	WGF	SAR	SAR	SAR	SAR
1996	1996	ATL	SAR	KEY	KEY	KEY	EGF	KEY	KEY	KEY	KEY	WGF	SAR	SAR	SAR	SAR
1997	1997	ATL	SAR	KEY	KEY	KEY	EGF	KEY	KEY	KEY	KEY	WGF	SAR	SAR	SAR	SAR
1998	1998	ATL	KEY	KEY	KEY	KEY	EGF	KEY	KEY	KEY	KEY	WGF	SAR	SAR	SAR	SAR
1999	1999	ATL	SAR	KEY	KEY	KEY	EGF	SAR	SAR	KEY	KEY	WGF	SAR	SAR	SAR	SAR
2000	2000	ATL	SAR	KEY	KEY	KEY	EGF	KEY	KEY	KEY	KEY	WGF	SAR	SAR	SAR	SAR
2001	2001	ATL	SAR	KEY	KEY	KEY	EGF	KEY	SAR	KEY	KEY	WGF	SAR	SAR	SAR	SAR
2002	2002	ATL	SAR	SAR	SAR	SAR	EGF	KEY	KEY	SAR	SAR	WGF	SAR	SAR	SAR	SAR

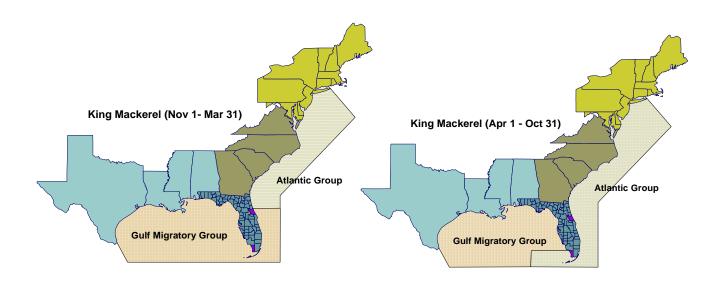


Figure 1. Boundary definitions for the Atlantic and Gulf migratory groups of king mackerel.

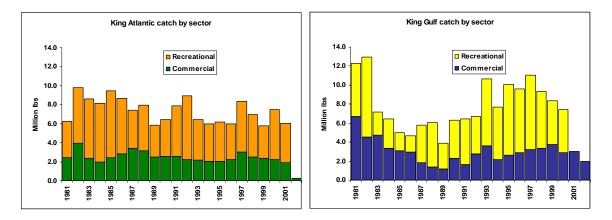
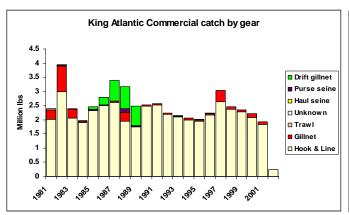


Figure 2. King mackerel catch by sector, calendar year. Data for 2001-02 is partial data.



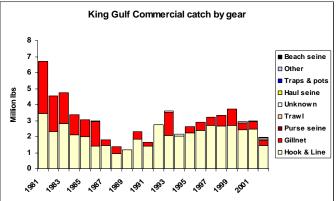
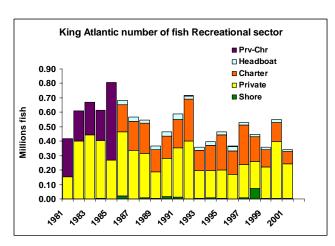


Figure 3. King mackerel catch by gear for the commercial sector.



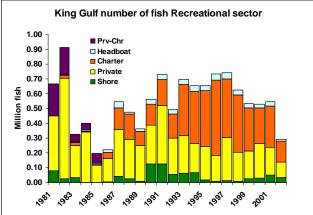
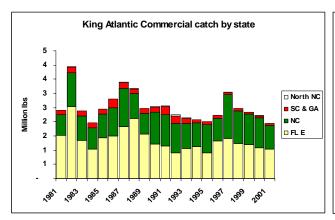


Figure 4. King mackerel catch by mode for the recreational sector.



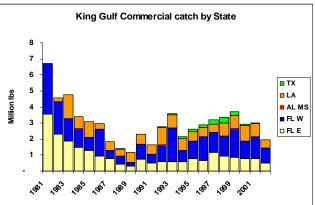
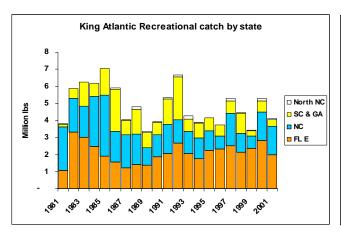


Figure 5 King commercial catches distribution by region.



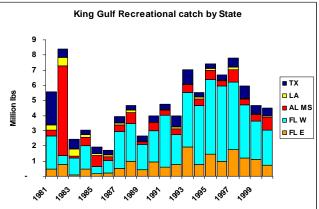
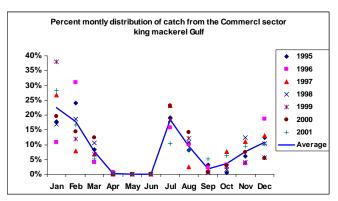


Figure 6. King recreational catch distribution by region.



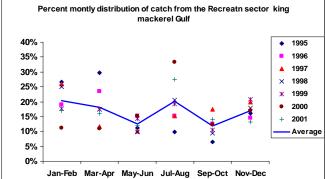
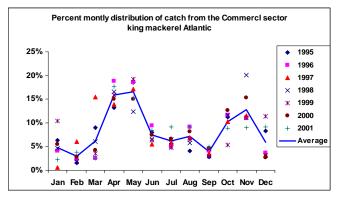


Figure 7. Percent monthly distribution of catch for Gulf king mackerel by sector from 1995 to 2002.



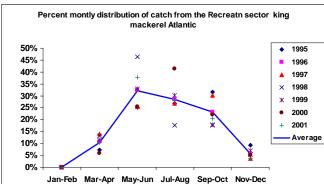
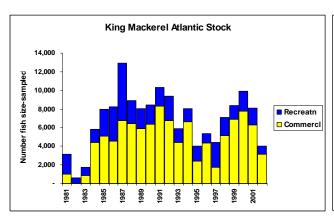


Figure 8. Percent monthly distribution of catch for Atlantic king mackerel by sector from 1995 to 2002.



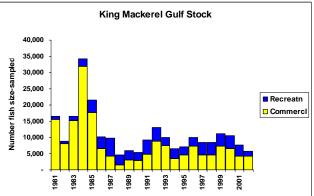
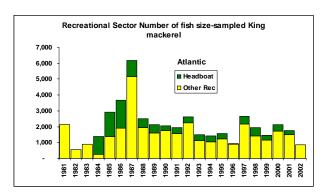


Figure 9. Number of fish size sampled from king mackerel fisheries.



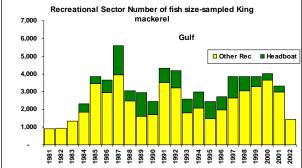
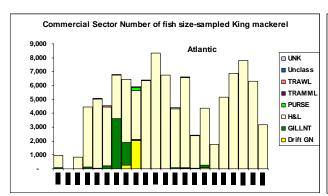


Figure 10. Annual distribution of fish size sampled from king mackerel recreational fisheries.



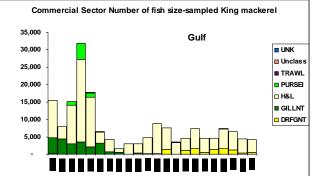
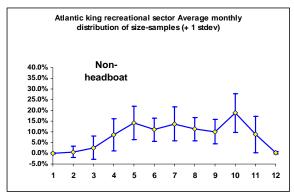


Figure 11. Annual distribution of fish size sampled from king mackerel commercial fisheries by gear.



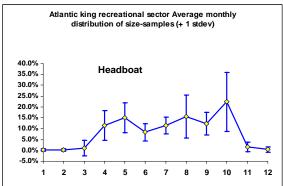
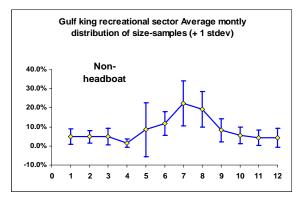


Figure 12. Monthly distribution of size samples of Atlantic king recreational fisheries (1981-2002).



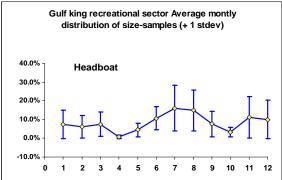
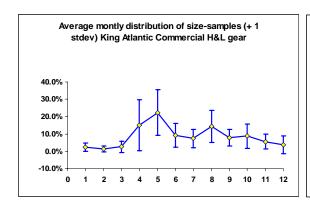


Figure 13. Monthly distribution of size samples of Gulf king recreational fisheries (1981-2002).



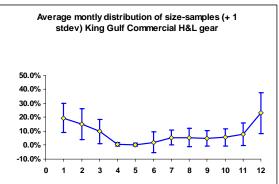


Figure 14. Monthly distribution of size samples of Atlantic and Gulf king commercial fisheries (hook and line gear only, 1981-2002).

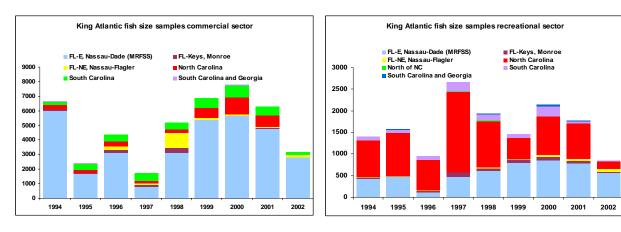


Figure 15. Size samples of Atlantic king by sector and subarea.

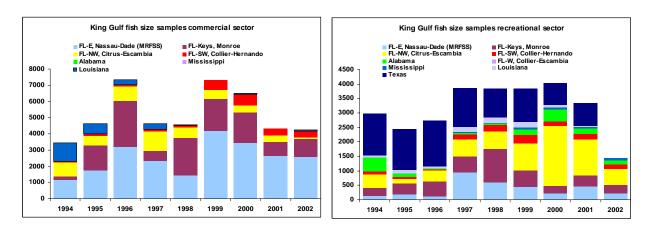


Figure 16. Size samples of Gulf king by sector and subarea.

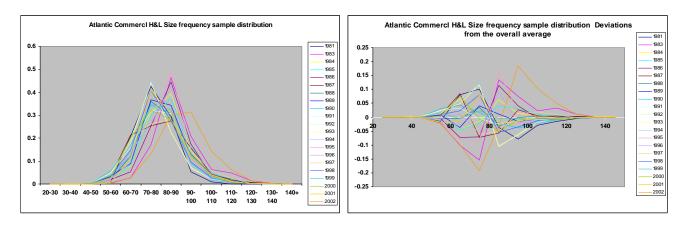


Figure 17. Sample size frequency distributions of Atlantic king for the commercial (hook & line) fisheries.

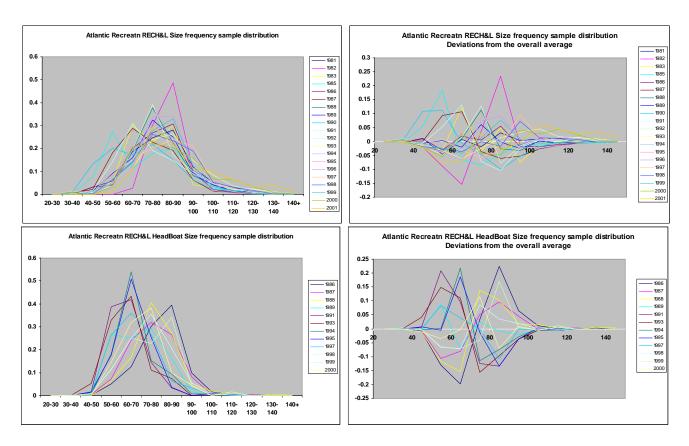


Figure 18. Sample size frequency distributions of Atlantic king for the recreational fisheries.

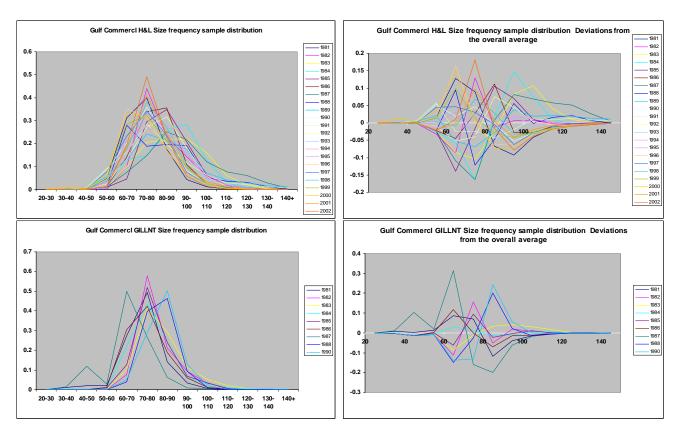


Figure 19. Sample size frequency distributions of Gulf king from the commercial fisheries by gear type; top hook & line, bottom gillnets.

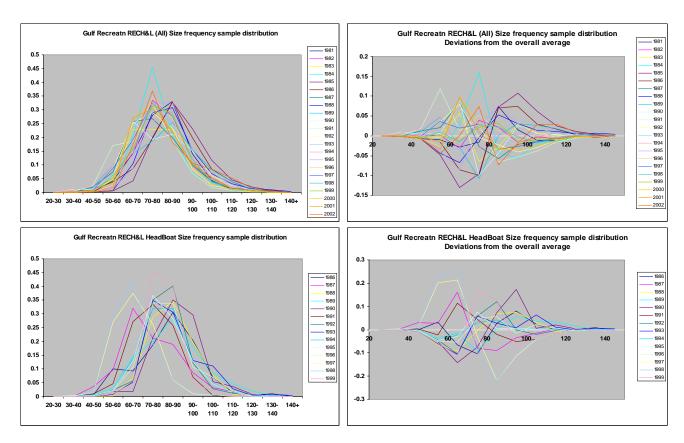


Figure 20. Sample size frequency distributions of Gulf king from the recreational fisheries by mode; top all recreational fisheries, bottom heatboat fishery.

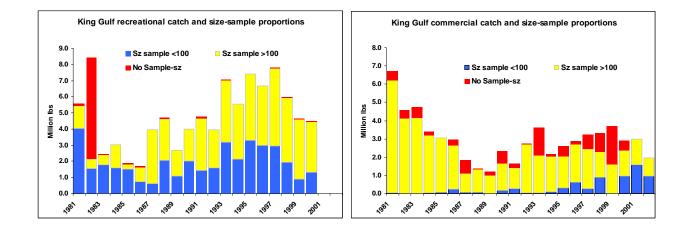


Figure 21. Distribution of catch with direct size frequency sample match for Gulf king by sector.

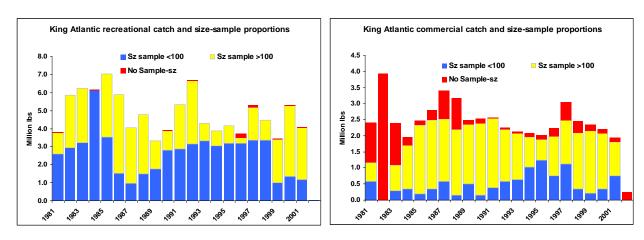


Figure 22. Distribution of catch with direct size frequency sample match for Atlantic king by sector.

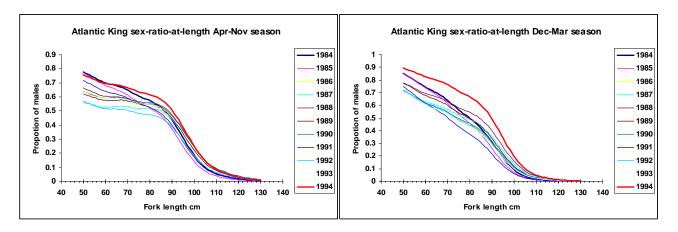


Figure 23.. Sex-ratio-at-length estimates for Atlantic king 1984-1994.

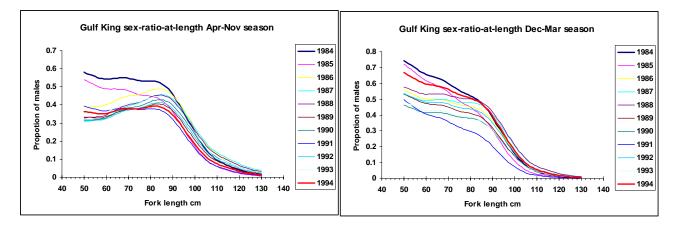


Figure 24 Sex-ratio-at-length estimates for Atlantic king 1984-1994.

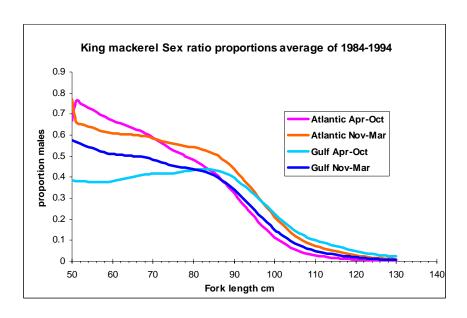


Figure 25. Average sex-ratio-at-length from the estimates of 1984-1994.

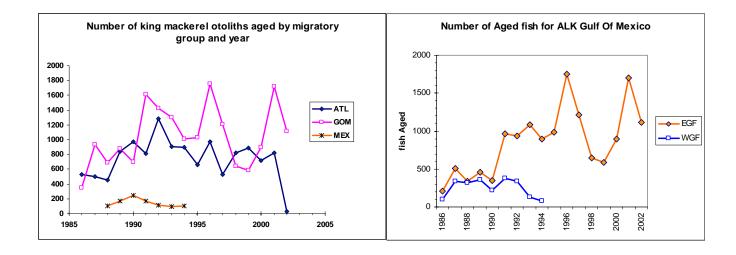


Figure 26. Number of otoliths aged by migratory group and year for king mackerel.

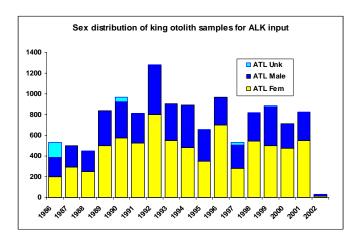


Figure 27. Sex distribution of Atlantic king otolith samples for ALK input

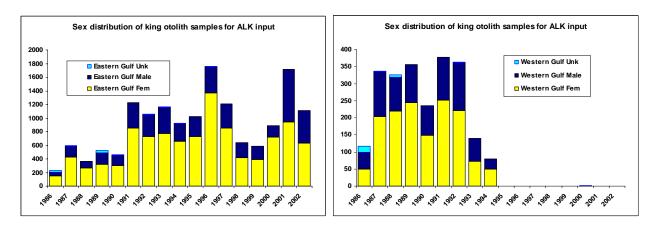


Figure 28. Sex distribution of Gulf king otolith samples for ALK input by main areas of the GOM.

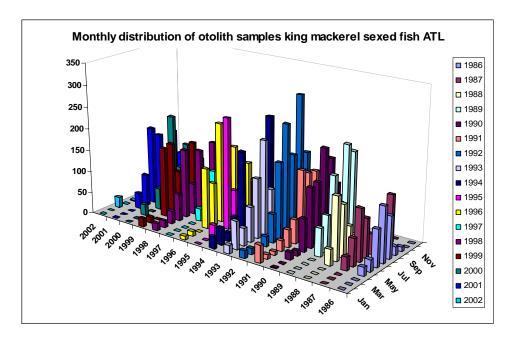


Figure 29. Atlantic king otolith samples by month and year.

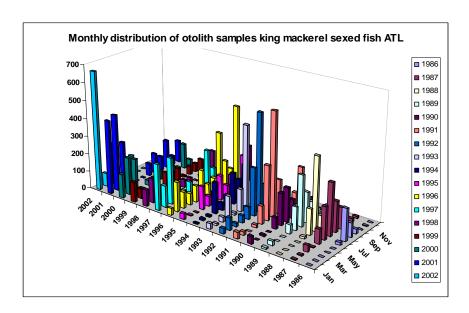


Figure 30. Gulf king mackerel otolith sample distribution by month and year.

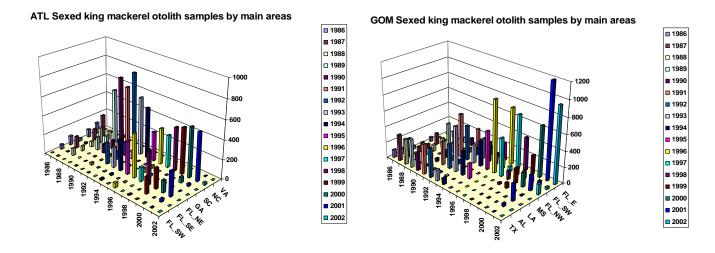
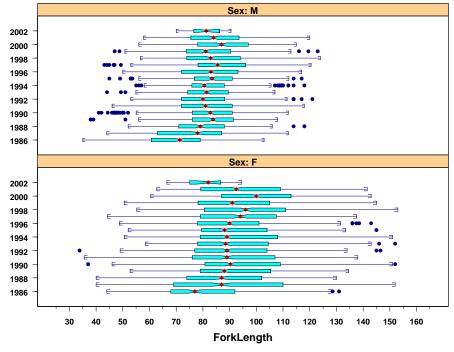


Figure 31. King mackerel otolith samples distribution by area and year for Atlantic and Gulf stocks.

King mackerel Atlantic



King mackerel Gulf of Mexico

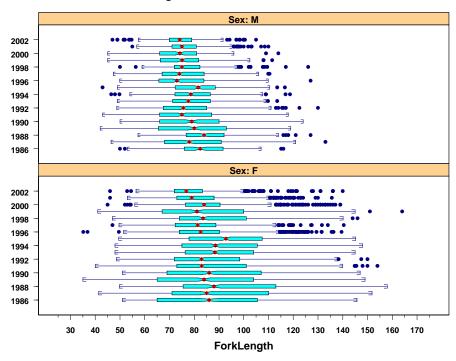


Figure 32. Box plots size distributions of king mackerel otolith aged fish for ALKs by migratory group

King Atlantic Age-length

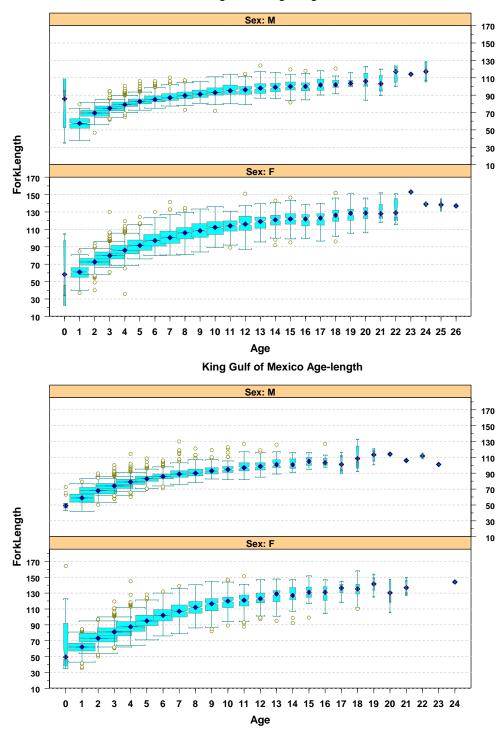
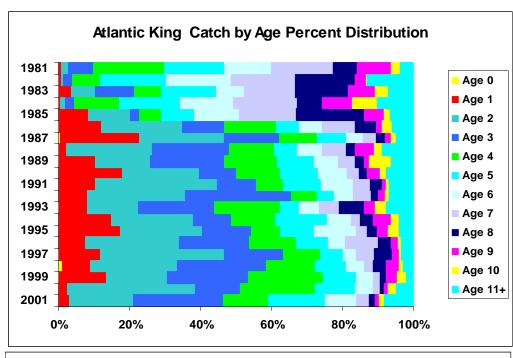


Figure 33. Age-length distribution of king mackerel by migratory group and sex. Box wide is proportional to the number of fish aged.



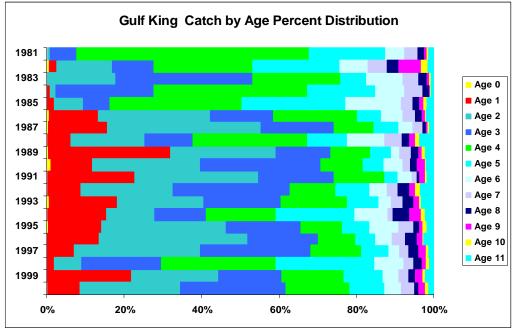


Figure 34. Percent Catch at age distribution for king mackerel by migratory group.

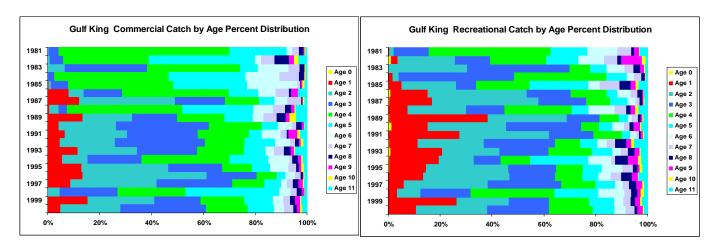


Figure 35. Percent catch at age distribution for Gulf King by sector.